

OPEN SPACE IN HOUSING:  
A Conceptualization of the Role of Design  
by  
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Signature of Author.....

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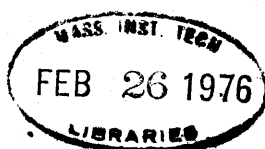
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## DEDICATION

To my parents, who prepared me

To my wife, Lillian, who guided and supported me

To the people of the First United Presbyterian  
Church of Cambridge, who upheld me with their  
prayers

## OPEN SPACE IN HOUSING:

### A Conceptualization of the Role of Design

Andrew Miao

"Submitted to the Department of Architecture on February 20, 1976 in partial fulfillment of the requirements for the degree of Masters of Architecture".

## ABSTRACT

This thesis examines the role of design in formulating open spaces for low-rise subsidized housing developments. The study starts with the postulation of several categories of concerns important to a resident's overall satisfactions with the open spaces at his housing site. Interviews and observations generated data that were analyzed to test whether the categories were actually important to overall satisfaction. A set of categories revised according to study findings, are then considered with regard to their influences on each other. These influences between categories are combined with actors in a typical housing development process into a "model of interrelationships". This model provides a method of identifying points of intervention under various conditions.

The categories are also divided into two groups according to the strength of design's influence on that category. It is shown by means of a graphic technique that categories weakly linked to design have a stronger influence on overall satisfactions than do those strongly linked to design. However, some evidence from our study shows that design can contribute to a fuller realization of human potentialities in a manner not gauged by satisfaction measures.

The appendices show study methodology as well as working guidelines for the choice and the arrangement of open spaces in housing developments.

Thesis Supervisor: Stanford Anderson

Title: Professor of History and Architecture

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# CHAPTER ONE      THE INTRODUCTION

## REMINISCENCES

The vivid memories of my childhood are inextricably linked to the "compound" outside Manila where my family lived. Our "compound" was a two-acre lot with five houses, a guardhouse, and several garages on it. The "compound" was owned by a bank, and apartments in the "compound" were rented to bank employees. Living there were fourteen families totalling about eighty people of all ages.

The "compound" always had many kids around so that neither my sister nor I ever lacked playmates. Fortunately there was always enough room for everyone. All of the "compound's" open space was completely accessible for our play. And we used it fully. We would play hide-and-seek, or climb the huge vined rubber tree, or pick fruits like star-apples and mangoes. Growing up in the "compound" was a precious experience.

Looking back at those memories, I can better understand why I associate variety, richness, choice, spaciousness, and companionship to communal open spaces. But my associations are personal, communal open

spaces do not inherently come with those attributes I had found in our "compound".

During the years in architectural school, I discovered an interest in housing and housing environments. Most of my training, however, had been in the design of built space. In this thesis I wanted to investigate the design of open space -- the complement of built space.

It seemed to me that the inside of our house and the outside spaces were all part of my memories of growing up. But ever since I left the "compound", indoor experiences alone dominate my memories. Often I realized I had not enjoyed the outdoors for months. And I felt the loss. Thus, I wanted to understand how I, as an architect, could design environments that helped integrate the experiences of both the inside and the outside spaces into a total experience of living.

## THE PURPOSE AND THE OBJECTIVES OF THE THESIS

Open spaces can either be areas for recreational activities, social contact, aesthetic pleasure, or areas that are neglected, littered, dangerous, serving no common benefit. This thesis looks at the factors that influence open space's contribution to the housing environment. The purpose of this work is to study the interrelationships between the various factors in order to better understand how design can help create open spaces in housing that are supportive and beneficial to site residents. The title of this thesis is thus an encapsulation of that basic motivation.

The work presented here is exploratory; the findings do no more than suggest directions for further work. The results are not meant to be



conclusive proofs. The scope of the work was planned to be broad in order to cover and to interrelate most concerns thought to be essential to open space design. There are two types of findings from this study. One type involves a new method of analyzing data. The other type includes substantive understandings about concerns related to the role of design in open spaces.

Each step in our process of conceptualizing the role of design in open spaces is stated as a separate study objective. The objectives are as follows:

- 1) Postulate categories of open space concerns
- 2) Gather data according to those categories
- 3) Use the data to demonstrate the effect of satisfactions with individual categories on overall satisfaction with open space in housing
- 4) Identify interrelationships between the relevant categories
- 5) Postulate points in the development process where maximum leverage can be applied to improve a housing environment.

Taken individually, these objectives outline my working method and are the basis of the organization for the thesis.

## THE ORGANIZATION OF THE THESIS

The next chapter, Chapter Two, describes the fieldwork of this study. It discussed the choice of a primary data gathering method and the choice of study sites. Chapter Three sets the conceptual framework of the thesis. This framework is based on the identification of six categories of concerns that we postulate to be important to the design of open spaces. Chapter Four uses the categories as a means of structuring our field data.

Then the chapter develops a method to demonstrate the effect of a resident's satisfactions with individual categories on levels of his overall satisfaction with site open spaces. Chapter Five draws on our own study as well as the literature in order to identify influences of individual categories on other categories. This is the emphasis in a chapter that ostensibly is reviewing each of the categories. The influences of categories on each other are finally integrated with the actors in the housing development process who have typically dealt with such categories of concerns. This combination of influences and relationships is called a model. The model shows who can intervene and where they can intervene in the housing development process in order to effectively deal with certain categories of problems or potential problems. Chapter Six presents the summary and the conclusions of the study.

## CHAPTER TWO THE FIELDWORK

The early period of this work was spent in the study of data gathering techniques. Behavior mapping (systematic observation of activity) was initially chosen as the primary study technique. However, after the author tried this technique on a preliminary site, he decided it was not appropriate to his study needs. Further investigation indicated that an informal tenant interview could elicit the necessary data and still be manageable within the constraints of this study. The first half of this chapter describes the choice, the development, and the use of the interview format.

The second half of this chapter is on the study sites. That section starts with a discussion of the general criteria for the choice of study sites. Three sites in the greater Boston area were subsequently chosen based on those criteria. Then discussion proceeds to a description and a comparison of those sites.

### THE DATA GATHERING

Information from the studied sites are of three basic types -- back-

ground information, observation of activities and of signs (described later), and subjective responses.

#### BACKGROUND INFORMATION

Each of the three principal study sites have been studied by others,<sup>1</sup> thereby providing some background information. This information was used to structure a management interview which focussed on the interest areas of this study. Together, the previous studies and the management interviews served as two different opinions on the same issue. These sources of background information greatly facilitated work in the sites.

#### OBSERVATION OF ACTIVITIES AND OF SIGNS

Observation of activities was initially explored then rejected as the primary data gathering technique. The Anonymous Travel Fellowship awarded to the author in the summer of 1975 provided an opportunity to conduct a behavior mapping study<sup>\*</sup> in the Dutch garden town of Vreewijk.<sup>\*\*</sup> While the results were satisfactory, limitations in the technique made behavior mapping inappropriate as the primary technique for this study. Behavior mapping is mainly useful for intrasite comparisons. Because societal level concerns are likely to affect the entire site uniformly, differences in activities are assumed to be explainable by differences in the settings within which the activities occur. However, different sites do not provide the common context that is necessary for testing such an assumption. Taking the differences into account would have been

<sup>\*</sup> Behavior mapping is a systematic, unobstrusive, observational technique used to record behavioral phenomena as they occur in their natural setting.

<sup>\*\*</sup> A summary of the results of the Vreewijk study is reported in APPENDIX A.

a research task in itself. Two significant British reports, Children at Play and Children's Play on Housing Estates, rely heavily on interviews to explain both intrasite and intersite observations. As a result these reports are more convincing than others<sup>2</sup> based on behavior mapping alone.

Since this study does not use behavior mapping, which involves systematic, regular, and extended observations, the nonsystematic, irregular, and quick observation of activity used here is not a valid instrument in itself. Observation of activity is included only to corroborate and to supplement findings from interviews, which is the primary data gathering technique of this study. An interviewer who has taken an informal inventory of the types and the general level of activity in a site in advance can better understand a respondent's description of activities during an interview. The interviewer is also able to formulate questions based on discrepancies between his informal observations and the findings of more complete behavioral mapping studies. Thus informal observation of activity when used in conjunction with behavioral mapping studies of similar sites is useful support technique.

Another support technique is observation of signs. Examples of signs<sup>\*</sup> are accretion or wear caused by a previous use, objects set forth to serve a present purpose, and markers left to stake out a continuing claim. Entire studies have been structured on this technique. For example, IMAI (1973) -- "Litter in Open Spaces of Multi-Family Housing Sites" -- is a study of attitudes towards the maintenance of communal open spaces based on observations of a litter pattern. Our study does not give obser-

\*APPENDIX B is a partial list of signs and their possible meanings.

vation of signs so prominent a role because the purpose of this work extends beyond the scope covered by the catalog of proven signs.

#### SUBJECTIVE RESPONSES

One of the study objectives is to demonstrate the effect of satisfactions with postulated categories of concerns of resident's overall satisfaction with open spaces. The interview was chosen as the means of obtaining direct resident evaluations.\*

Questionnaires written for each of the three sites were consistent with regard to obtaining information about the postulated categories. Other questions were added or deleted depending on specific circumstances within a site as revealed by observations or background information. In other words, each questionnaire has two types of questions. The first type was formal and consistent for all sites. Data obtained from these questions are used to relate satisfaction with specific concerns to overall satisfaction. The second type of question varied from site to site. These questions were exploratory and findings that are not totally conclusive or unrelated to the focus of this study are left out but they have nevertheless contributed to the author's understanding of open space design. All three questionnaires and coding instructions for the formal questions are included as APPENDIX C. Tabulated results to each question are reported in APPENDIX D.

The questionnaires with their sequence of questions provided a structure for the interviews. However there was no strict adherence to an inter-

\* Other methods are also possible. Content analysis of children's drawings, essays and cognitive maps have also been used. They are valid but would not have consistently produced input for all the study categories.

view schedule. The reasons for this are as follows. First, language usage differs across and within communities. One can assure consensus in the meaning of questions by elaboration and probing. Second, an interview produced by a person with the author's limited experience<sup>\*</sup> in instrument design is likely to be weak especially in areas with which the respondent is not familiar. For example, some residents of one site, with housing clustered around common courts, did not understand the question --"Do you think this is a good size for a housing group?" Size to these respondents was not something they could talk about apart from use. So, an explanation of the question of size in terms of availability of children's play spaces or outdoor storage space was helpful. This process of discussing an unfamiliar question with a respondent was important to the setting of an informal and low pressure tone to the interview and the establishment of rapport between the two communicating parties. This contact facilitated volunteering of information that, while not directly relevant to the question, later proved a valuable resource in understanding the situation. As a consequence of informal inputs, interviews varied in length from fifteen minutes to two hours. Most took around forty minutes.

It was an early decision in this study to spend efforts learning more about the subject of the research rather than perfecting an interview format. That decision led to two procedures. First, there was to be no pretesting of the instrument. Second, the interviewer memorized the interview questions, then conducted the interview from a list of key words

<sup>\*</sup>The author's previous experience includes a survey done for a planning course, and the development of an experimental questionnaire for a HEW funded MIT funded research project.

written on the answer sheet itself. The entire interview was thus conducted in one page, making the interview less formidable to a resident considering whether or not to be interviewed.

The questionnaires themselves varied between 25 and 40 questions. In the questionnaire administered at the first site, 7 out of 35 questions were taken from Clare Cooper's Easter Hill Study.<sup>3</sup> One question of the 35 was taken from Vere Hole's Children's Play on Housing Estates.<sup>4</sup> A total of 46 interviews were conducted by the author in three study sites in the Boston area. This fieldwork was started in the last week of October 1975 and completed two months later in the last week of December.

## THE RESPONDENTS

Persons interviewed in this study were not selected by a systematic technique, random or other. They were chosen according to their availability and willingness to be interviewed when the interviewer knocked at their doors. This method was considered justifiable in view of the intended use of the data to demonstrate a method of relating satisfaction with specific concerns and overall satisfaction. The sampling requirements\* of rigorous investigation are beyond the scope of this exploratory study.

A total of 46 interviews were conducted. Respondents were asked to speak for their families.\*\* Two basic types of families are of interest

\* Random sampling requires a larger sample. Stratified sampling requires more demographic information than is available to the author through previous studies, the census or management records. It is also significant that research is not conclusive about the relationship between specific demographic characteristics and satisfaction with open space.

\*\* Since all the interviews were conducted during working hours on weekdays, there is a large number of non-working women interviewed. Specific effects of this bias will be discussed as they become relevant to the text.



in this study -- elderly families and families with children. Three interviews of the 46 were excluded from the data analysis. One of the three rejected interviews involved a Spanish speaker who had very limited comprehension of English. The second involved a household of unrelated adults. The third involved a teenage respondent who made clear that she couldn't speak for her family.

Sixteen interviews are included from a cluster housing site in Brockton called Pine Grove. Three or four interviews were conducted in each of five clusters. Since management policy calls for a mix of a few elderly households in each cluster, the author made an effort to include an elderly respondent among the interviews conducted at each cluster.

Fourteen interviews are included from a low density townhouse site in Roxbury called Warren Gardens. Here half of the families interviewed are large, having three or more children, as well as one or two related adults living in the same unit.

Thirteen interviews are included from a medium density apartment site called Roxse Homes. Here, the proportion of family types by number of children is similar to that of Warren Gardens. Management estimates of the adult population indicate that there may be fewer related adults in Roxse apartments than in the Warren Garden townhouses.

TABLE 1 shows the family types of the respondents. This distribution does not represent an allocation of interviews based on resident proportionality.

TABLE 2 shows that the proportion of unit types of the respondents are similar to that of the unit composition of the site. While it is true that occupancy standards limit household size according to unit size, the fact that proportions of units are similar for the respondents and

TABLE 1

## FAMILY TYPES OF THE RESPONDENTS

	Pine Grove	Warren Gardens	Roxse Homes
Elderly Families	4 (25%)	2 (14%)	1 (8%)
Families With Toddlers And Young Children	12 (75%)	1 (7%)	5 (38%)
Families With Older Children and Teenagers	0 (0%)	9 (65%)	3 (23%)
Families With Children Of Mixed Ages	0 (0%)	2 (14%)	4 (31%)
	16 (100%)	14 (100%)	13 (100%)

TABLE 2

PROPORTION OF SITE UNIT SIZES COMPARED TO  
THE PROPORTION OF RESPONDENT UNIT SIZES

UNIT SIZE		Pine Grove	Warren Gardens	Roxse Homes
Efficiency	site	0 (0%)	22 (10%)	0 (0%)
	respondent	0 (0%)	1 (7%)	0 (0%)
1 Bedroom	site	0 (0%)	13 (6%)	0 (0%)
	respondent	0 (0%)	0 (0%)	0 (0%)
2 Bedroom	site	354 (87%)	0 (0%)	15 (12%)
	respondent	14 (88%)	0 (0%)	2 (15%)
3 Bedroom	site	53 (13%)	180 (79%)	60 (48%)
	respondent	2 (12%)	11 (79%)	6 (46%)
4 Bedroom	site	0 (0%)	12 (5%)	51 (40%)
	respondent	0 (0%)	2 (14%)	5 (39%)
TOTAL	site	407 (100%)	227 (100%)	126 (100%)
	respondent	16 (100%)	14 (100%)	13 (100%)

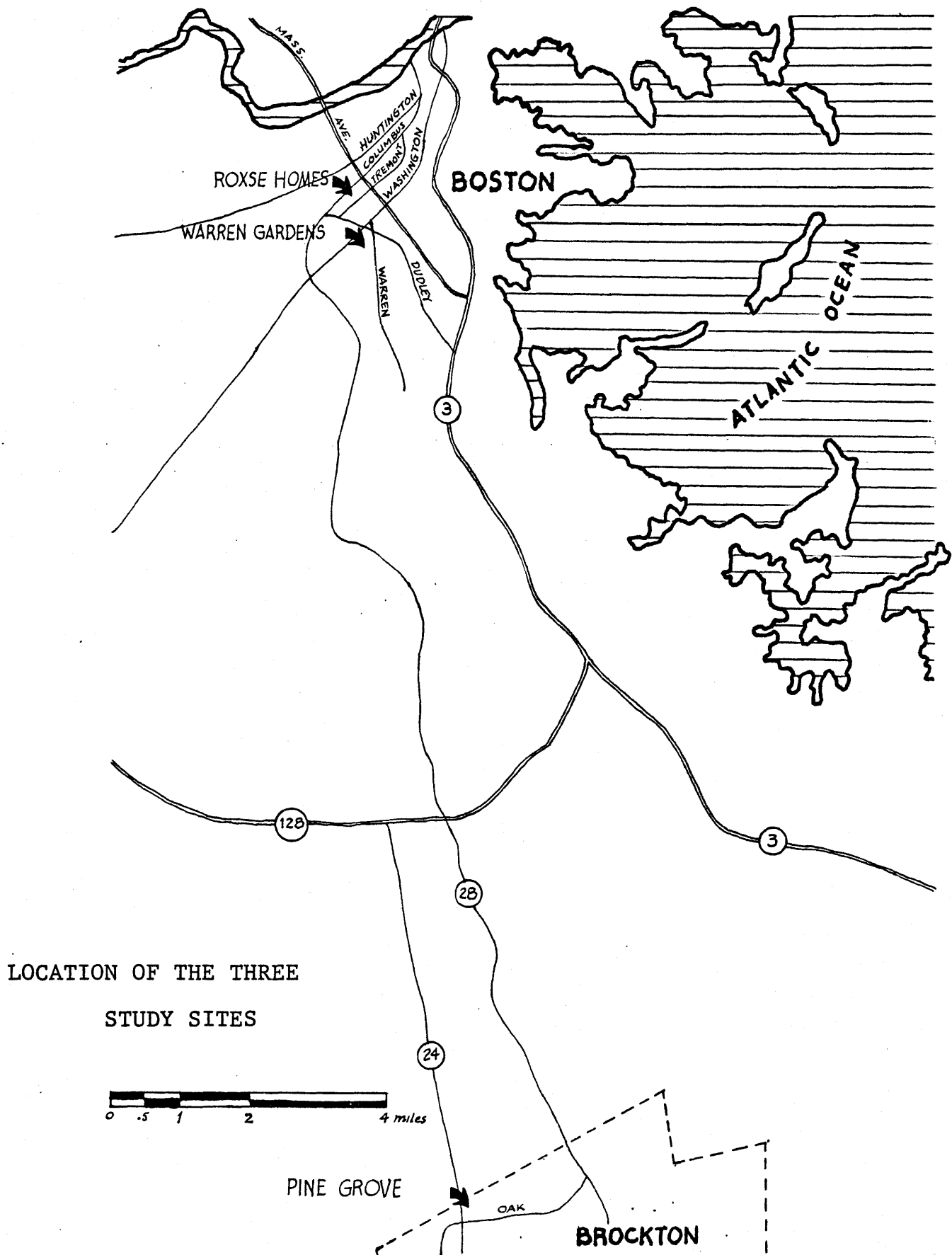
for the site does not mean the family sizes or types of our respondents necessarily represent what are on the sites.

## THE STUDY SITES

The interviews were done in three sites in the Boston area (FIGURE 1).<sup>\*</sup> Accessibility for site visits was a basic selection criterion. Another criterion restricted study sites to subsidized developments. Limited monies available for building this type of housing prevent the inclusion of all "good ideas" generated by those concerned. The final choice of which ideas should be included in the design of such housing is thus more critical. In addition, people housed in subsidized developments are among those who have the least amount of input into the shaping of their homes. Making known the perceptions and preferences of low and moderate income families is one way of expanding the influence of these people on the development process. All three of the study sites receive federal subsidy either from FHA Sect.236 or Sect.221(d)3 (Below Market Interest Rate) programs. The lowered mortgage interest rates are passed on as lower rents that are available and affordable by moderate income families. Low income families are able to live in these developments through direct subsidies to them either in the form of rent supplement or through a leased housing program (Sect.23 of the 1965 U.S. Housing Act). Included in the terms of the original housing subsidy program is

<sup>\*</sup>Preliminary methodological work was done at a fourth site -- Vreewijk --in Holland. Description of the site and the work there are reported in APPENDIX A.

FIGURE 1



the requirement that an agreed number of units be reserved for low income families in order to make the developments economically "mixed".

A third study criterion used in site selection is that the developments be low rise, walk up. This means three floors or less. Research<sup>5</sup> in Britain, Denmark, and Sweden all agree that children who lived in housing units near the ground played outside more than children who lived higher up. Federal Housing Administration (FHA) development guidelines also require more open space per dwelling unit in low rise developments than they do in higher rise developments.\*

Within these criteria, the first two study sites, Pine Grove and Warren Gardens were chosen for the variety in their site open spaces. But these two sites are in such different settings that there was little basis of comparison. A third site, Roxse Homes was chosen in a setting similar to Warren Gardens. Both Roxse Homes and Pine Grove are medium density developments with what tenants consider to be "excellent" management companies overseeing them. Thus a comparison between Roxse Homes and Pine Grove can show the effect of different settings. On the other hand, a comparison between Warren Gardens and Roxse Homes shows the effect of a difference in management quality. Having discussed the sites as a group, we will next look at them individually.

\* According to HUD - FHA Land Planning Bulletin #3, Data Sheet 19, a typical three story development would be required to have more than four times as much open space per dwelling unit than would a typical twelve story development.

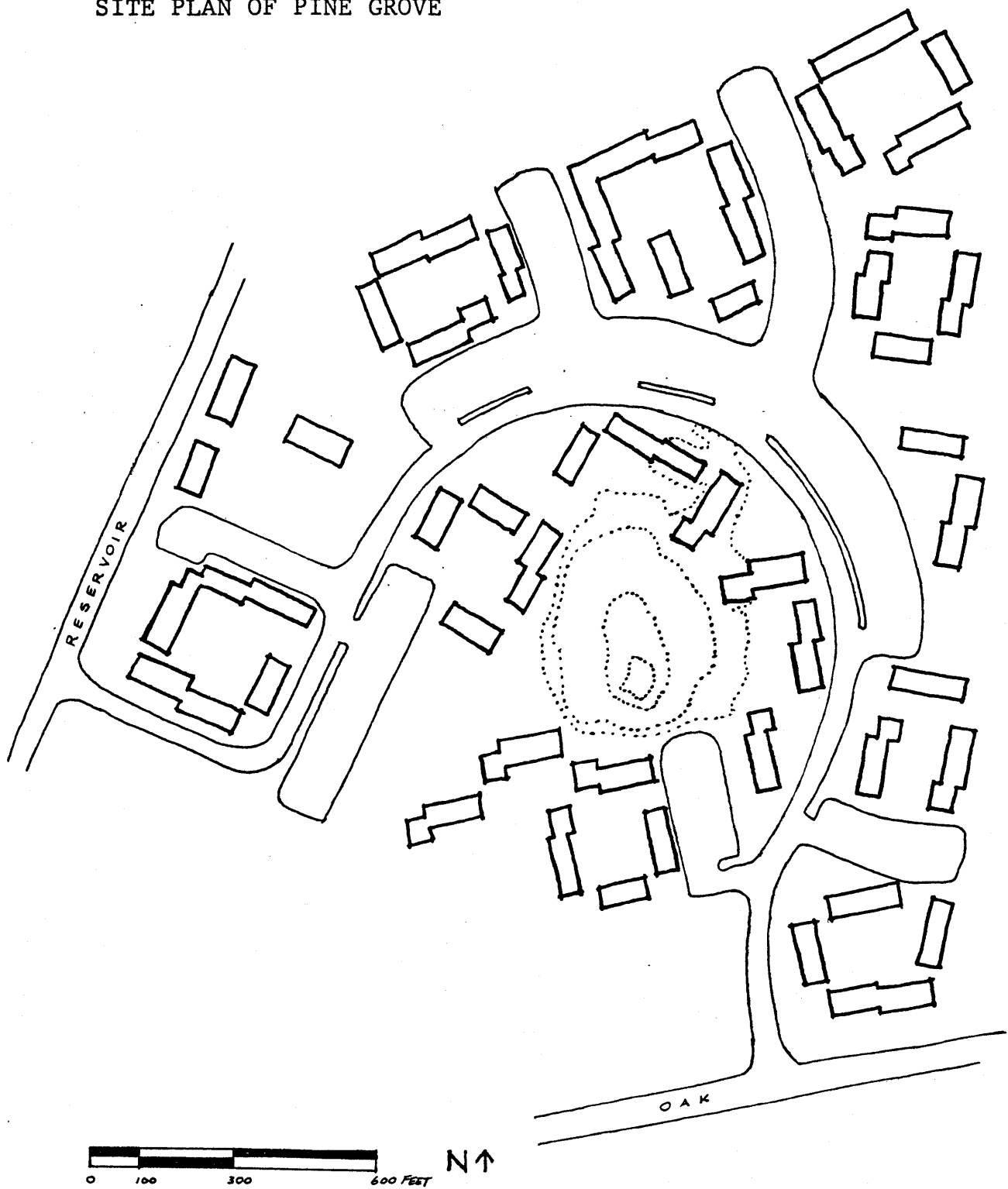
PINE GROVE APARTMENTS,<sup>6</sup> BROCKTON, MASSACHUSETTS  
407 units on 16 acres, MHFA FHA funded, completed in 1972

Brockton is a fast growing city 25 miles south of Boston. Pine Grove Apartments is situated at the northeast corner of the city in an area that has been zoned for multi-family housing. The site had been a wooded area. The architects, Jung/Brannen Associates, preserved much of the "rustic" feeling of the site by means of landscaping and building materials. A road (FIGURE 2), through the site curves almost all the way around a central hill which has been saved as a natural recreation area. The buildings are of wood construction, with pitched roofs, and covered by redwood stained clapboard siding (FIGURE 3). The dwelling units within a building are so arranged so that three units share a covered concrete pad that shelters the three entrance doors. One door opens into a ground floor unit. The other two open into stairways which lead up to two double story units stacked on top of the first ground floor unit. The 407 units are built into 44 buildings of varying sizes. These buildings are clustered around 12 common courtyards, (FIGURE 4), off the curving road. None of the units have yards, but residents are provided with communal facilities such as sand boxes in their courts, playgrounds with equipment, a swimming pool, and all the space between buildings and clusters.

Parking is always behind the clusters so that residents must first go into the courts in order to reach their dwelling entrance. The court thus becomes the area where many people first meet their neighbors.

Maintenance is contracted to Pemberton management, a subsidiary company of Beacon Construction Company, the owner of Pine Grove. Pemberton has a good reputation and has been approved by the Massachusetts Housing

FIGURE 2  
SITE PLAN OF PINE GROVE



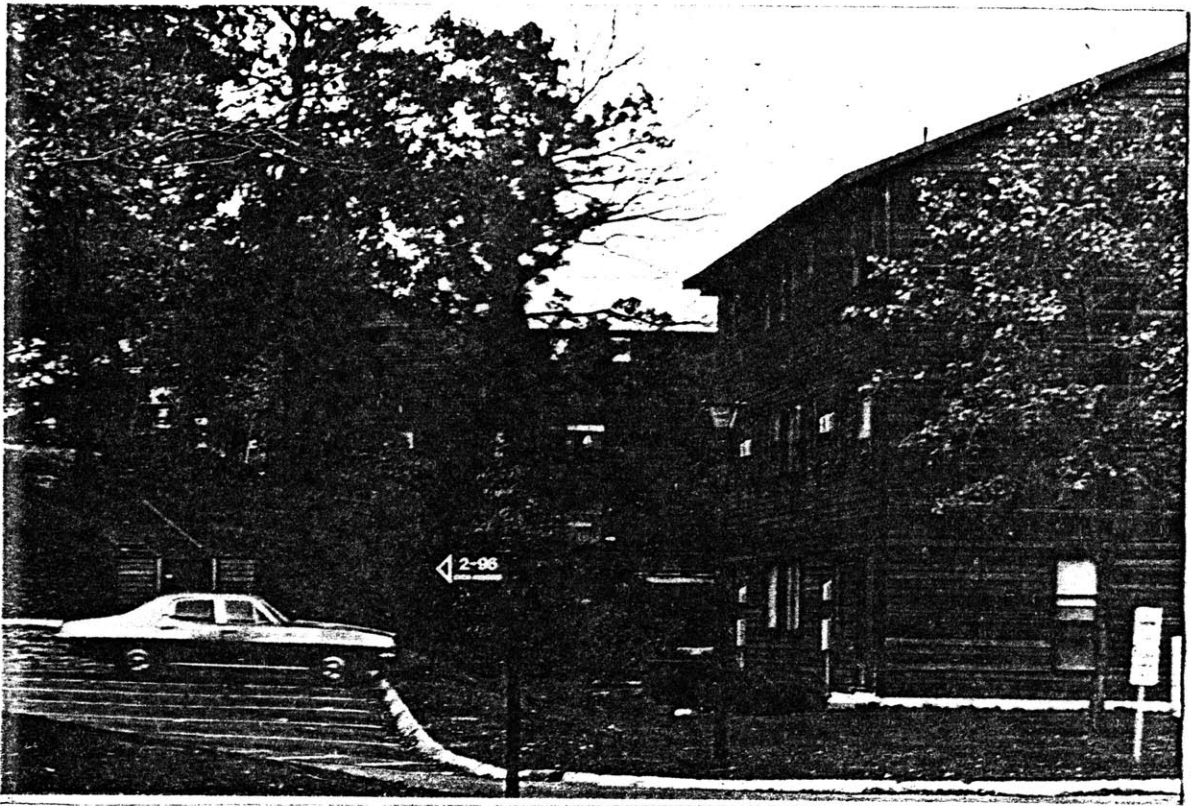


FIGURE 3 General View of Pine Grove



FIGURE 4 Common Courtyards (Photograph by Battaglia et al)



Finance Agency (MHFA), a sponsoring agency that emphasizes good management. The residents of Pine Grove give high marks to the maintenance program. They like the site manager and know well the three maintenance men who live on site as part of their job. In addition to this three-man crew there is another full time maintenance supervisor. Pemberton provides 24 - hour emergency service. If work is beyond the skills of the maintenance men, Beacon Construction Company can provide the necessary tradesmen.

In general, Pine Grove residents are happy there. Many however look at Pine Grove only as a step to their single family dream house. As a result there is a high turnover rate at Pine Grove.

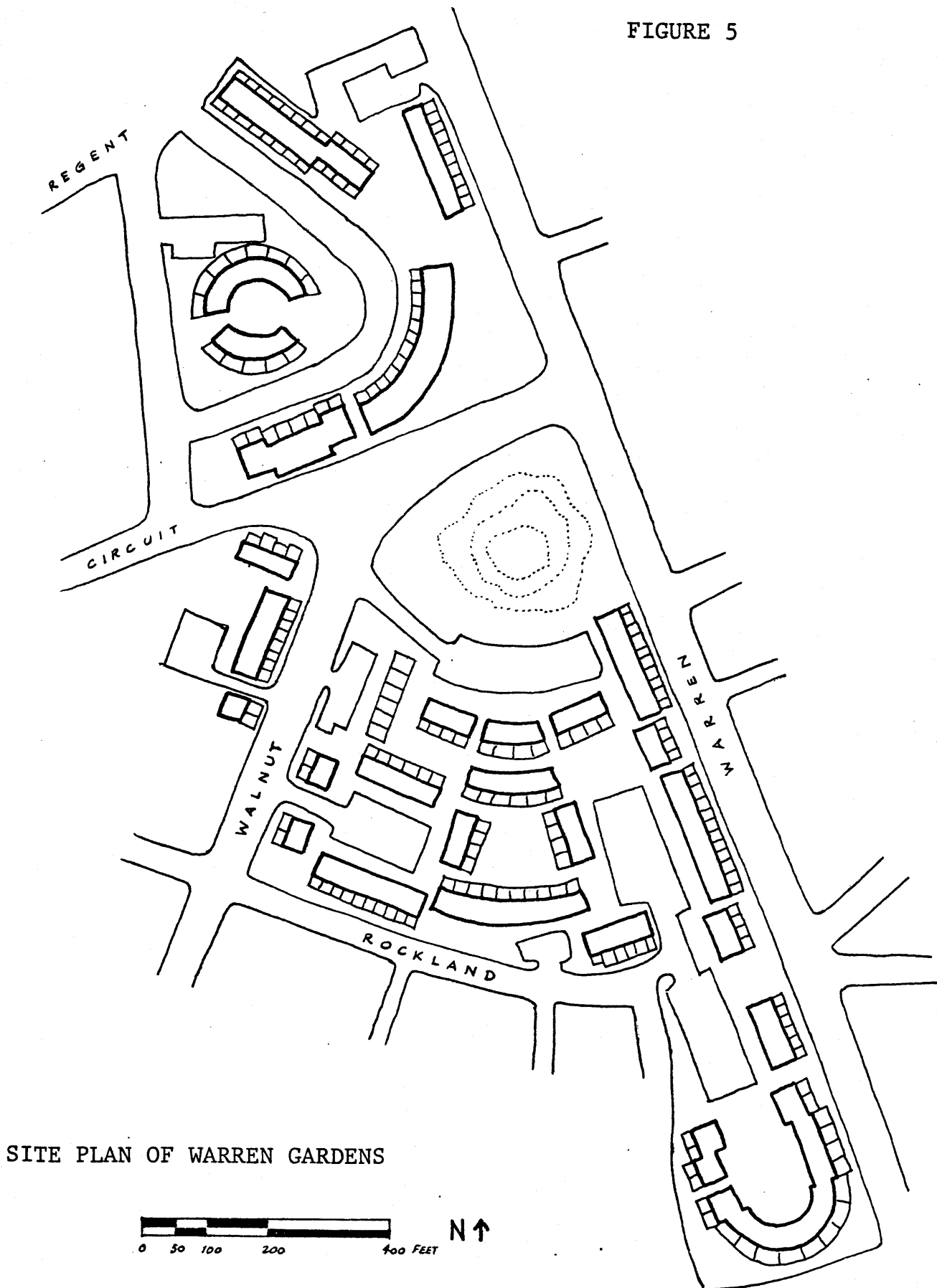
### WARREN GARDENS,<sup>7</sup> ROXBURY, MASSACHUSETTS

227 units on 23.5 acres, FHA funded, completed in 1968

Warren Gardens is located in the Washington Park Redevelopment area in Roxbury. Roxbury is the largest black neighborhood in the city of Boston. It is one of the high crime areas in Boston.

The hilly site along the major thoroughfare, Warren Avenue, is divided by Circuit Road into two sections, (FIGURE 5). The smaller section is north of the road. The townhouses on them are arranged in arcs following the contours of a hill that peaks around the middle of the section. At that peak, two arcs of attached units almost complete a donut around a small and cozy paved courtyard. The second section, south of Circuit Road, is shaped like a gigantic lower case letter "g". Right at the top of the letter, adjacent to the dividing road, is a wooded hill left as a natural

FIGURE 5



SITE PLAN OF WARREN GARDENS

recreation area. Unlike Pine Grove, however, it is rarely used. In the rest of this section concentric arcs and radial rows of attached townhouses define a field of varied open spaces. Some units are arranged around a large natural area. Others around a quiet sitting corner, most however, cluster around parking lots which jut into the site from boundary streets. Since front door access is from the parking lots, many residents identify their units with the closest lot, (FIGURE 6). At the tail of the letter "g" is a horseshoe shaped cluster of units around a partially paved courtyard, (FIGURE 7). Most of the units have some partially enclosed private space in addition to the range of interbuilding communal spaces. However the architect, John R. Myers, probably never expected that so few of the yards would be used. Most yards are neglected, overgrown and used as storage as junk.

The townhouses are constructed of unpainted concrete hollowblocks. Individual units, defined between two fire walls, are either two or three floors depending on the unit size. Shed type roof, chosen by the architects, look strange to some residents. Most units are larger than those of Pine Grove. (Almost 80% of Warren Gardens units are three bedroom townhouses.)

Maintenance at Warren Gardens is generally poor. Williams Management Company, contracted by FHA to handle maintenance, is discouraged by the prospects of adequate money to improve maintenance. The site manager concedes that with inadequate funds and his small staff of two full-time maintenance men, he is forced to neglect "certain sections" of the site. Wind-blown litter, broken glass, spilled garbage, destroyed plants all confirm the manager's statement.

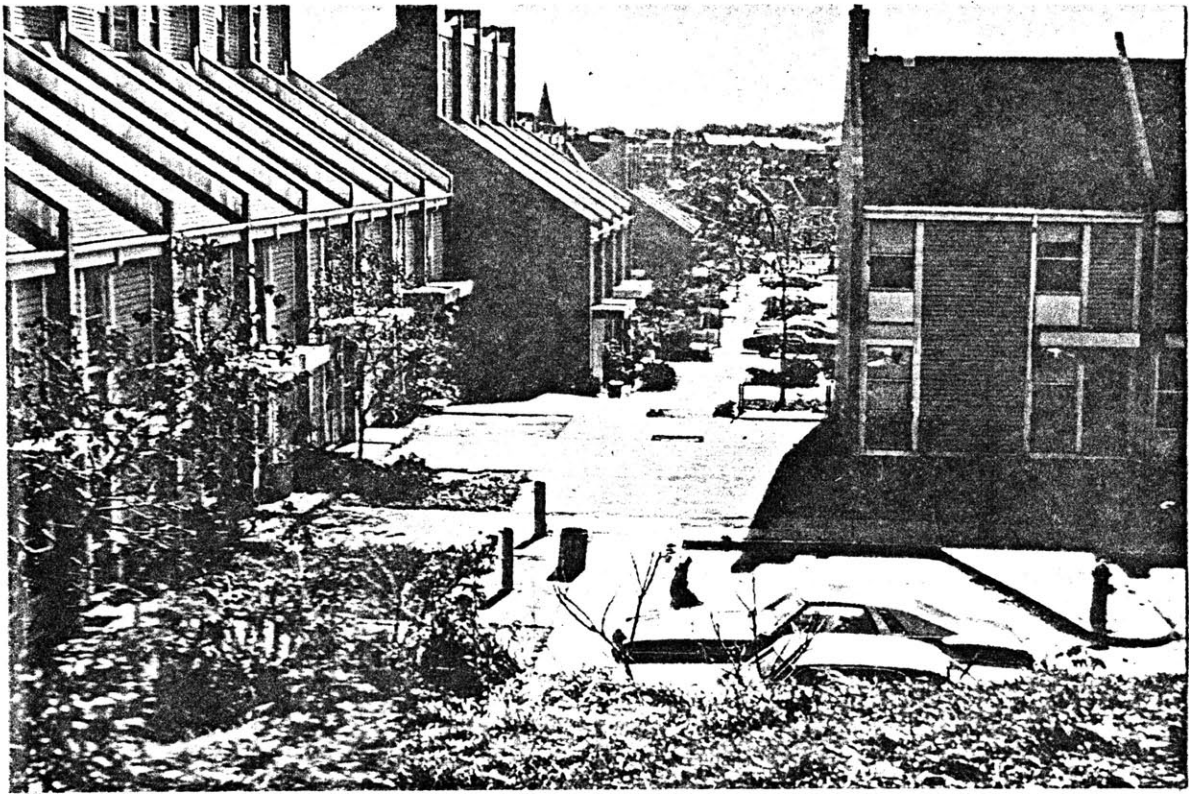


FIGURE 6 Townhouses and Parking Courts in Warren Gardens



FIGURE 7 Units around a Horseshoe-shaped Court

The residents at Warren Gardens see the neglect but they seem resigned. They don't see how they can expect the management to do more. Many have lived here since the development was opened and they sadly remember how beautiful it was then. But many still feel this is the best place around. The turnover rate is, not surprisingly, quite low.

ROXSE HOMES<sup>8</sup> (Parcel 23), ROXBURY, MASSACHUSETTS  
126 units on 4.75 acres, FHA funded, completed in 1970

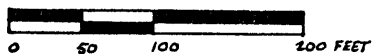
Roxse stands for "Roxbury-South End". The name represents the location of the site as well as the citizen group whose neighborhood development efforts eventually produced Roxse Homes.

Roxse Homes includes housing in three parcels of land separated by a few blocks. Our study site is one of the three designated as Parcel 23. This parcel is made up of 126 units (about a third of those on all three parcels) built into seven three-floor apartment buildings. The buildings are "L" shaped. Their arrangement on the long and thin site produce a serpentine series of three "S's", (FIGURE 8). Along the east edge of the site (Kendall St.), building defined courts were fixed up as a paved play area for children, (FIGURE 9). A low grass mound planted with small trees helps separate the play area from Kendall Street.

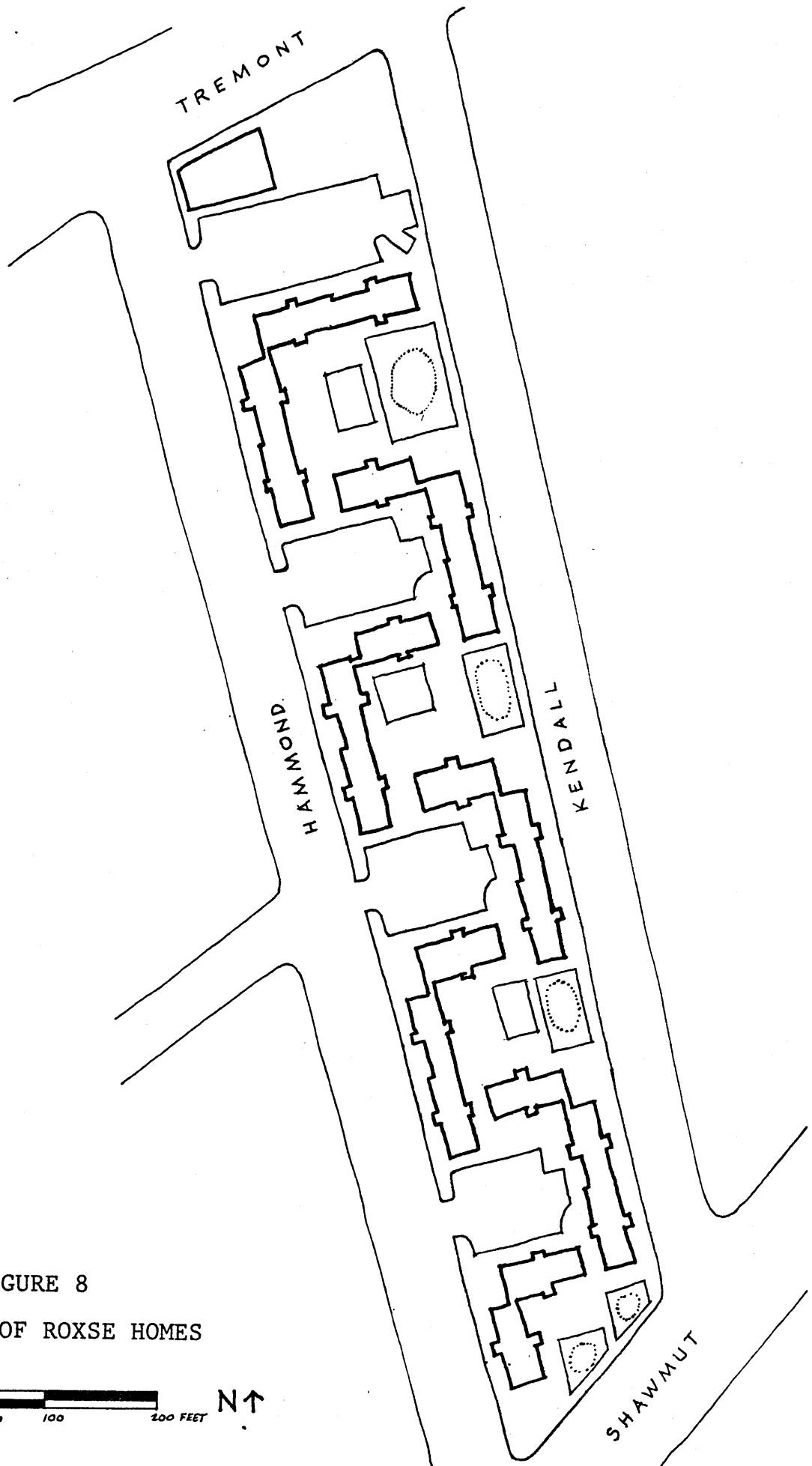
On the west edge of the site (Hammond Street), the areas defined by the buildings are parking lots, (FIGURE 10). But the largest lot is located adjacent to the top "S" and is not surrounded by buildings.

Construction of the buildings is precast concrete. The Architect's Collaborative (TAC) arranged the apartments so that every six apartments would share both front and back entrances. The two entrances and the stair-

FIGURE 8  
SITE PLAN OF ROXSE HOMES



N ↑



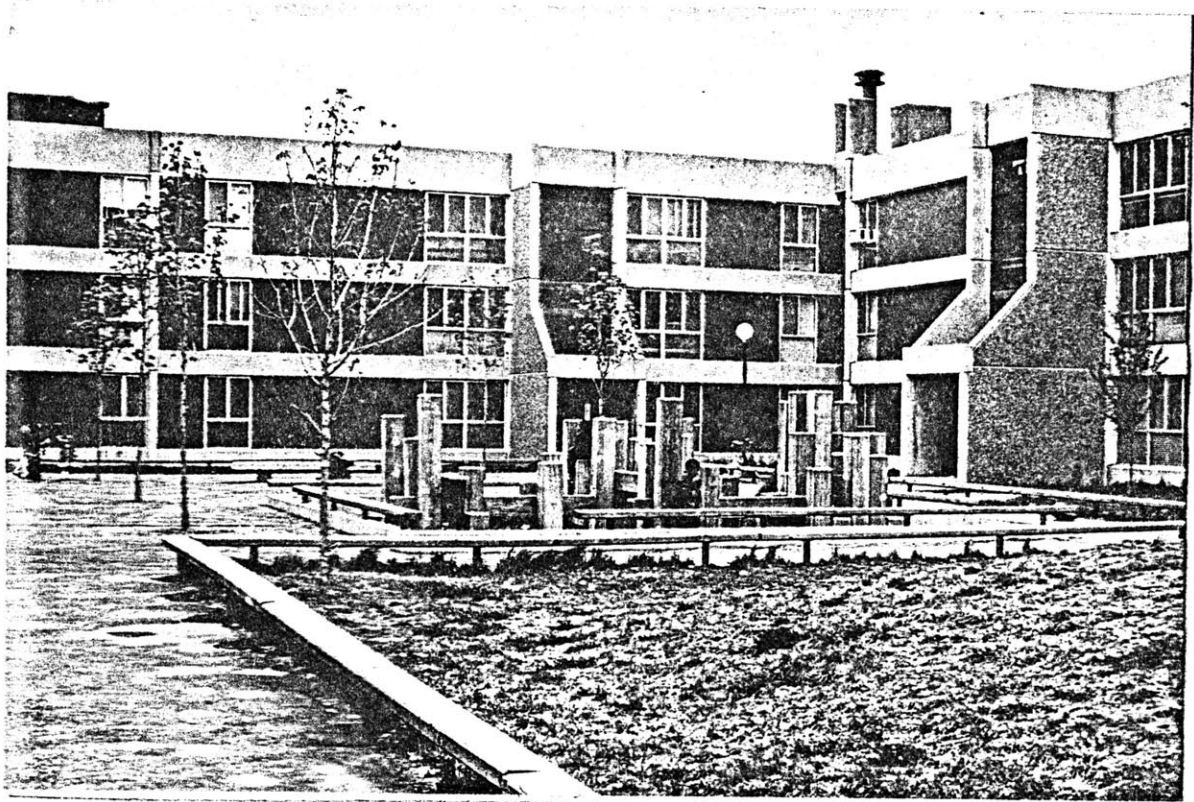


FIGURE 9 Play Court with a Planted Mound (Photograph by Auchincloss et al)



FIGURE 10 Parking Court Building Entrance

ways that connect them to the apartments are distinct and totally separated by a fire wall between them. Referring back to FIGURE 9, we can see how each apartment has access to both parking and play areas.

This arrangement does not produce any feelings of territory because as most of those interviewed suggested, a resident could not be sure whether his unit belongs to the front parking court or the back play court. In fact each unit belongs to two courts.

The most notable aspect of Roxse Homes is its management, specifically, the manager, Roland T. Peters. Peters comes to the job well qualified. He has worked in both the Boston Housing Authority (BHA) and the Boston Redevelopment Agency (BRA). For the latter organization, he served in the capacity of head of relocation. He has a strong management philosophy centered around "involvement";--involvement of management with tenants and of tenants with each other. Peters is convinced that this is the only way housing can make it. Fortunately, with the complete support of the Roxse Homes Board (owners of the development) he is able to make his policies according to his philosophy.

Practically, Peters' policies involve no more than "good housekeeping" and "watching out for one's neighbors". Peters' style is personal. He interviews each Roxse applicant at their homes to screen out any not likely to be a responsible housekeeper. Accepted applicants attend pre-housing orientation meetings where they are taught, with lectures and visual material, how to use and to keep up their apartment. After occupancy tenants are required<sup>\*</sup> to attend regular post housing meetings and

<sup>\*</sup>"Required" means emphasized by management, supported by the Board, agreed upon by the tenants. The actual binding legal force behind it has never been tested. In this context legal support seems almost extraneous.



to have their units inspected quarterly. Because tenants have become acquainted with Peters, his approval has weight. His reprimand is more to be feared than an eviction. Peter's effectiveness largely hinges on the credibility he has. He is firm when he needs to be and "soft" at other times. For example, he will not stand for drugs or crime in Roxse. But he is flexible in efforts to help out tenants with special difficulties. He wields much power but uses it also to support and to nurture the struggling tenant council.

It is not true that under Peters' management, Roxse has most problems under control. Spilled garbage, rats, leaks in apartments are problems that have persisted for years. The five man maintenance crew works hard but the problems are still not completely solved. Inadequate fixed rents in an inflationary economy has forced Roxse to choose between repaying their mortgage thus allowing the development deteriorate and upkeeping Roxse thus defaulting on payments. Roxse chose the latter. FHA, the mortgagee, agrees tacitly with the choice by not foreclosing. So Roxse is not in good shape. But Peters makes sure that his tenants understand Roxse's difficulties. If problems are not immediately solved, tenants realize it isn't because no one is trying and that the problem has been forgotten.

#### COMPARISON OF THE DENSITIES OF THE STUDY SITES

Housing density is usually measured by dwelling units per unit area (often an acre). But dwelling units vary in size. Hence came the measure of bedrooms per acre (BRPA). But bedrooms can be shared by any number of people. Hence, persons per acre (PPA) was suggested. Yet in open

space studies, "persons" is not specific enough, since children (persons under 18) are the main users of outdoor spaces. Thus children per acre (CPA) would be even a more appropriate measure.

Having stated the above, it should also be stated that the actual measure is only part of the problem. Right now, the effects of various densities on housing satisfaction are not known. Amos Rapaport<sup>9</sup> makes a case for more research on the intervening human mechanisms that affect individuals' perceptions of density or crowdedness.

It is not our intent to resolve this issue. The comparison of five density indices below (TABLE 3) is simply meant to aid the reader to see the relative densities of use within the three study sites.

TABLE 3

COMPARISON OF THE DENSITIES OF THE THREE STUDY SITES

	Dwelling Units Per Acre	BRPA	PPA	Persons Per Bedroom	CPA
Pine Grove	25.5	52	73	1.40	30
Warren Gardens	9.7	27	39	1.47	5
Roxse Homes	26.5	88	117	1.32	60

From "dwelling units per acre", alone, it might seem that Pine Grove and Roxse Homes have similar densities. Since Roxse Homes predominantly has three and four bedroom units as compared to Pine Grove's predominant two bedroom units, Roxse Homes has capacity to house more people per acre than Pine Grove. In fact, Roxse has more than one and a half times as

many people per acre and twice as many children per acre as does Pine Grove.

Comparing the two Roxbury sites, we see that Roxse Homes has about three times as many dwelling units and people per acre as does Warren Gardens. But Roxse Homes has, not three, but twelve times as many children as does Warren Gardens, suggesting that Roxse Homes which is the most built up of our study sites also has to provide for most children per acre. Warren Garden, on the other hand, is the least built up and most capable of providing outdoor spaces for children; but it has the lowest children density.\* It is interesting to note that Roxse Homes has the fewest people per bedroom of the three sites, suggesting that while the allocation of space was generous in providing indoor space for each person it was parsimonious in providing outdoor space.

\* The Warren Garden statistics are from the 1970 census. Since children were reported to be only 13% of the resident population (compared to the 50% at Roxse Homes), it is reasonable to assume that most Warren Garden families had few and young children. Between the time the census was taken and the time of this study--six years--it is likely that the proportion of children has increased especially since a low turnover rate at this site indicates many of the original families still living there.

## CHAPTER THREE THE CONCEPTUAL FRAMEWORK

### AN ENVIRONMENTAL SATISFACTION WORKING DIAGRAM

That the environment and human behavior interact, that they are each capable of altering the other, is a current and widely held belief. While this study shares that belief, attention will only be given to an individual's reaction to his environment.

The environment focused on in this thesis is open spaces in housing. The physical reality of the site--its location, the types and the arrangement of buildings, its landscaping, its circulation system, its upkeep, and its various uses--is shaped by different decisions. Some of these are design decisions, others are program or even policy decisions. Evaluations of the physical elements of the site by people who live there yield valuable feedback to the original decision makers. The architect, the planner, and the politician must make decisions based on other people's needs. Therefore, it is important for such people to realize that their actions could

be totally reinterpreted by those who are affected by the actions.

An illustration from Warren Gardens, one of the study sites, speaks to that point. The architects of that development specified unpainted concrete blocks to be the basic building material of the townhouses. The architects thought this material to be honest and natural. The residents, on the other hand, felt it to be "cheap" and indicative of a tendency to save money at the expense of a proper finish. Thus the architect's original intention of choosing a honest material had ironically been reinterpreted as a device to cheat low income residents.

To better understand the reinterpretation process, we suggest that two "filtering" mechanisms operate simultaneously. One filter is "context". Context includes social, political, and locational factors that modify, absorb or redirect the effects of the original decision. In this case, the change of passing off an inferior material arose out of a perceived political framework in which low income people did not have a voice in the design process. Their helplessness and fear of exploitation is implied in their perception.

At the same time, individuals have their unique pattern of social, cultural, economic, educational, and psychological preconditioning. This is the second filter which we call the "personal filter". Something in the residents' experience must have triggered the response of cheapness in regard to unpainted concrete blocks. It might be that this material was associated with cheap construction as used in warehouses or factories. Or perhaps the residents felt that clapboard siding would have been more appropriate to their image of a house so that any other facade material was thus to be a compromise. Unless the users themselves are heard, those responsible for the design choices will never know what the users want.

group--low income residents.

The relationship between the housing environment and individual's reaction to it is diagrammed in FIGURE 11.

The intention of this thesis is to suggest a method to study the effect of varying levels of satisfactions with individual categories on the level of overall satisfaction. Since we know that design can contribute much in the individual categories of elements, we can also see the extent of a designer's role and influence on overall satisfaction.

## THE POSTULATION OF CATEGORIES

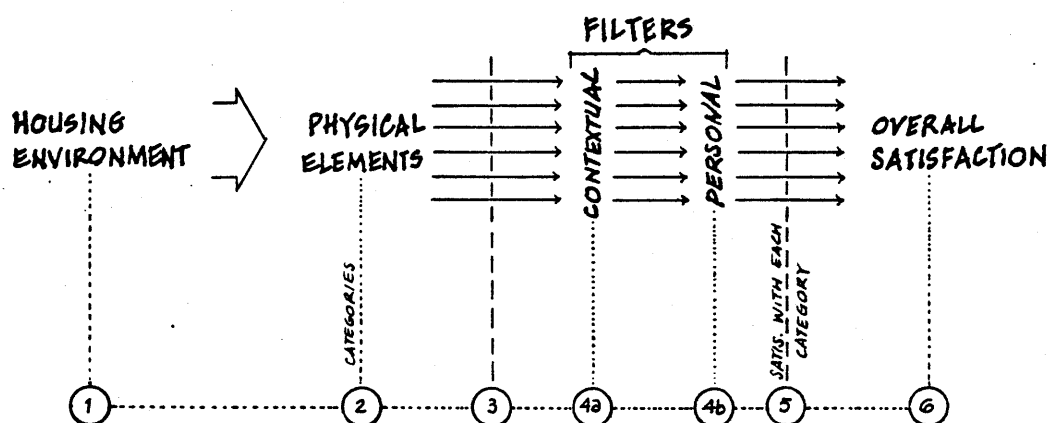
If we were to imagine the link (in FIGURE 11) between the housing environment and overall satisfaction as a rope, then we could break the rope apart and identify individual threads that make up the rope. There are many threads even within the subarea of our study -- open spaces in the housing environment. This study suggests that our categories of physical elements grouped by common areas of concern are like the threads.

For the purposes of this study, we postulate six categories which are most essential in establishing a link between open spaces in housing and levels of overall satisfaction with that subarea.

The six categories we postulate as essential are maintenance, security, community, image, privacy and access. The first two categories, maintenance and security, are straightforward. Community deals with the degree of belongingness individuals feel toward the group of people who live near them. Image deals with a matching of expectations with reality. Privacy deals with control of information about, or physical access to, one's

FIGURE 11

RELATIONSHIP BETWEEN THE HOUSING ENVIRONMENT  
AND INDIVIDUAL SATISFACTION



Housing environments, (1) whether they are built or projected, can be seen as an aggregation of individual physical elements (2). These elements can be organized into categories (3) according to their different areas of concern. Individuals view these categories of elements through two filters. The "contextual filter" (4a) sets the categories within a social, political, and locational context. The "personal filter" (4b) sets the categories in relation to the individual's cultural, economic, educational, and psychological preconditioning. Individuals evaluate each category of elements according to their expectations. This evaluation implies a level of satisfaction associated with each category (5). Finally, satisfactions with individual categories is indication of some level of overall satisfaction (6) with the housing environment.

An informal interview later described was used in this study, in order to encourage a respondent to voice their feelings about specific areas of their environment. A study such as this one, however, is only one of many ways to increase the influence of a traditionally disenfranchised

family. Access, in this case, deals only with availability of appropriate activity spaces.

These six categories do not cover all possible areas of concern. If we analyze the 118 guidelines about open space design compiled by Clare Cooper, we see several areas of concern not covered by our categories. Some concerns like durability, microclimate effects, and access to equipment were not included because they seemed too specific for our categories which were meant to be useful at preliminary stages of project planning and site design. Others such as a concern for variety are partially included under the access category. Again, it is the broad concern of variety in types of open spaces, rather than the narrow concern of variety in plant types, which is included. Variety in types of open spaces does not stand as a separate category because there is evidence<sup>1</sup> from the Easter Hill study that residents conceive of the site in parts as they experience it. Variety as a concept is not as clear to the residents as it is to the designer or the planner who survey the entire site as a whole in the site plan. Since each of our categories are for resident evaluation, it is appropriate to include "variety" under "access to activity spaces" since that makes obvious the essence of variety in types of open spaces -- i.e. the provision of adequate and appropriate open spaces for a variety of activities and preferences. Other concerns such as space surveillance, or child supervision or play safety are already covered by our categories. Upcoming detailed discussion on each category will be helpful in answering questions about what is covered by the categories.

In any case, the categories are not meant to be complete. They are postulated first as categories that are individually important to overall



satisfaction, and second as categories which as a group are sufficient to explain levels of overall satisfaction. Whether or not they meet those requirements will be tested later in this study.

## THE DESCRIPTION OF EACH CATEGORY

### MAINTENANCE

#### DEFINITION

"Maintenance" refers to upkeep, cleaning, trash disposal and storage, repair of grounds. The term is used in this case to include only those areas used communally.

#### RELATED QUESTIONS ASKED DURING THE INTERVIEW

- How do you feel about the upkeep of the common spaces?
- Would you be willing to help?
- How do you feel about the way people around here use the common open spaces? Do they take good care or do they abuse it?

#### DISCUSSION

The importance of maintenance cannot be overemphasized. Several studies<sup>2</sup> found maintenance to be one of two chief determinants of neighborhood satisfaction. (The other determinant is the social characteristics of the neighbors, a factor we will discuss under the community category.)

The level of maintenance affects an individual's self esteem. ROYSE (1968), a city planning dissertation on social inferences via environmental cues, found that for all social groups "maintenance was the attribute most frequently used in making social inferences"<sup>3</sup>... All groups will downgrade

an area on class and relative and other scales if there is trash in the area. "4

## SECURITY

### DEFINITION

Security refers to freedom from real or perceived threats to one's person or property due to crime.

### RELATED QUESTIONS ASKED DURING THE INTERVIEW

-Do you feel safe living in this place?

### DISCUSSION

Crime statistics only explain part of an individual's security feelings. The individual's knowledge of and experience with specific incidences of crime probably figure more prominently in his assessment of security. This is even more true in cities where citizens regularly hear of crimes through the media. During the interview only one direct question is asked about the respondent's perceptions of security. Other probes are initiated where barred windows, additional locks and jimmied doors suggest that further elaboration is needed.

## COMMUNITY

### DEFINITION

"Community" refers to commonality of interests, identification

and a sense of belongingness among people who live close to each other.

#### RELATED QUESTIONS ASKED DURING THE INTERVIEW

-In general, would you say this is a friendly place to live?

-About how many people here would you know well enough to greet?

-Are there people here you would consider as friends (i.e. visit or invite home)?

-How do you feel about the way people around here use the common open spaces? Do they take good care or do they abuse it?

#### DISCUSSION

Our earlier discussion of "maintenance" referred to the findings of several studies that indicated that the social characteristics of neighbors and maintenance are the two chief determinants of satisfaction with a housing environment.

Some writers such as Cooper, Zeisel, and Gans<sup>5</sup> believe that a certain amount of homogeneity in the social characteristics of neighbors is necessary to develop a sense of community by enhancing neighboring relations. The author of this study disagrees with those writers and finds more persuasive the result of a large sample study<sup>6</sup> by the Massachusetts Housing Finance Agency (MHFA). Their report found that neither homogeneity in income (closely related to social class) nor homogeneity in age (or stage in life cycle) is critical to tenant housing satisfactions:

...income mix 'works' or does not work according to whether or not the mix occurs in a well-designed, well-constructed, well-managed development...Income mix and racial mix are, in themselves of no particular relevance.<sup>7</sup>

Another study that studied the relationship between density and friendship formation, LEE (1968), suggests that a homogeneous development will

not even produce better neighboring relations than mixed developments:

The absence of relationship between number of friends and density removes any force from the argument that people in a given locality should be pre-selected for similarity in social class or other ways so that they can make friends easily. The number of 'similar' people will normally be adequate even in a mixed community...<sup>8</sup>

The MHFA study concludes that "the only two neighbor variables that were highly related to satisfaction were judgments that neighbors were friendly and that they were well behaved."<sup>9</sup>

## IMAGE

### DEFINITION

"Image" refers to the correspondence between an individual's impression of his dwelling environment and his expectations. This category includes two subcategories: "attractiveness" and "preference of present environment over the previous".

### RELATED QUESTIONS ASKED DURING THE INTERVIEW

-Do you find this site attractive?

-Do you like it better here or at the last place you lived?

### DISCUSSION

#### Attractiveness

While visual aesthetics is thought of primarily as subjective criteria, certain patterns are discernable over a large group. Consider attractiveness, the first subcategory. COOPER (1970), LANSING et al (1970), and no less than six other studies<sup>10</sup> identified the following four components of attractiveness:

- 1) plenty of grass and trees
- 2) pleasant layout
- 3) good views from the outside
- 4) good views from within buildings

#### Preference of Present Environment Over the Previous

The second subcategory -- preference of present environment over the previous -- is in fact a catch-all category. It catches information on the styles of the buildings, on feelings about the type of open spaces provided, as well as on individual assessments of life prospects. The assumption is that tenants who perceive each successive dwelling as better approximating their ideal house will be more satisfied than tenants who do not feel that way.

## PRIVACY

### DEFINITION

"Privacy" refers to selective control of access to one's family or group.<sup>11</sup> This category includes three kinds of privacy -- visual, aural, and territorial.

### RELATED QUESTIONS ASKED DURING THE INTERVIEW

- Are you bothered by people looking right in?
- Are you bothered by noise coming from the common open spaces?
- Do you think this is a good size for a housing group?

### DISCUSSION

#### Visual Privacy

Few low-rise multifamily developments have private yards. Some provide small semi-private yards. Semi-private yards are either yards that are shared by adjacent units or yards that are not totally enclosed from public view. The small semi-private yards do not act as any significant visual protection for the dwelling. Thus visual privacy may be lacking for both the semi-private yard and the dwelling next to the yard.

#### Aural Privacy

Within the yard, noise coming from nearby yards or common spaces may be unavoidable. Tenants associate the lack of aural privacy with spaces being packed too closely together.<sup>12</sup> Thus, assessment of aural privacy may be considered an indirect assessment of housing density.

#### Territorial Privacy

Territorial privacy exists when a space can be clearly felt to be the domain of one group. PASTALAN (1970), includes as part of his definition of an individual's sense of territory the following: "a psychological identification with a space symbolized by possessiveness and arrangements of objects in the area."<sup>13</sup> A sense of territory is often associated with a site layout in which dwellings access from and share a common facility, such as a play area, green space, entrance court, or parking lot. Adequacy of the facility to meet the needs of all the sharing residents is an important consideration. When there is too little space, for example, residents will be in conflict about rather than sharing the space. Thus, a sense of territory for a group is likely to develop where first, there is only enough space for that group but not outsiders, and second, there are mutual interests (e.g. use, security) to be served by claiming, pos-

sessing and defending that space.

## ACCESS

### DEFINITION

"Access" refers to the use of convenient, appropriate and safe outdoor activity spaces. "Access" includes three sub-categories -- access for the children, access for the adults and the elderly and access to the spaces outside of the site.

### RELATED QUESTIONS ASKED DURING THE INTERVIEW

- Are there places on-site for the children to play?
- Where do they mostly play?
- Do you feel there is adequate outdoor site spaces for your family's activities?
- What do you and your family like to do when you spend time out of doors?
- Where do you go?
- Do you have convenient and adequate parking?

### DISCUSSION

#### Access for the Children

Children are the primary users of outdoor space.<sup>14</sup> Child play studies distinguish between the play pattern of toddlers, young children, and older children.

Toddlers, or children under five, stick to a small area right outside the house. Behavior mapping studies<sup>15</sup> identify the home range as the area right next to the dwelling as defined by built elements such as entrances, stoops, fences, and courtyards. While most toddlers are allowed to play

outside without adult accompaniment,<sup>16</sup> mothers like to keep an eye on what they are doing.<sup>17</sup> Thus, proximity to the home and easy supervision by a parent who is indoors are important factors determining a toddler's use of outdoor spaces.

Young children, aged five to twelve, play outside more than any other group.<sup>18</sup> While not totally independent from parental supervision, the young child nevertheless needs to explore.<sup>19</sup> At age five children learn how to ride bicycles<sup>20</sup> thereby extending their potential range beyond the limits of their own dwelling site. While they can and do go far afield, this age group nevertheless plays near home an unusually large proportion of the time.<sup>21</sup> Thus proximity to the home is an important factor determining use. But unlike the toddler, the five to twelve year olds can go elsewhere if the areas adjacent to home are not liked. Physical characteristics of these areas can therefore influence the extent they will be used.

The older children and teens are almost independent from a reliance on the site to meet their open space needs. Compared to younger children they are less often seen outside within the proximity of the dwelling.<sup>22</sup> Certain types of site locations, however, can still attract older children and teens. Visible and active settings, street corners, or path junctures give them opportunities to socialize, to display themselves, and to watch their peers. Because their presence may so dominate an area, adjacent users may become irritated. Approximate "play" spaces for this group implies freedom from such conflicts.

Fortunately, there is a time dimension in the use of outside spaces by different age groups of children. MOORE (1974),<sup>23</sup> found that school keeps most children over five away until afternoon. Mornings are available for toddler's play. Between school dismissal and supper time there is a peak



activity period for all groups. After supper, use shifts to the older children and the teenagers.

#### Access for the Adults and the Elderly

This subcategory also refers to the open spaces on the site.

Adults who have jobs are away from their homes most of the day. Those adults who have household and childcare responsibilities find themselves occupied most of the day. Thus, low use of open spaces may still be consistent with high satisfaction especially if low use simply reflects a scarcity of time to go outside.

Elderly people, many of whom are often retired, have much more free time to do such activities as their physical conditions allow. Unlike children who are more active, the elderly enjoy sedate activities such as gardening, watching, reading, strolling, and lawn games. The elderly are sensitive to the noise and the rough behavior of some children. However, it is not an obvious conclusion that the elderly should live separate from families with children.

#### Access to Spaces Outside of the Site

This subcategory is used as a safety valve for those sites which have little or no appropriate site spaces. Access to an automobile to get the family to open spaces becomes the factor of importance in this case.

### MASLOW'S NEED HIERARCHY

The psychologist, Maslow, in writing about motivation, conceptualized a hierarchy of needs which helps order the categories used in this thesis.

His five need levels are arranged developmentally, which means lower needs in his scheme have to be adequately satisfied before higher needs emerge.

The following is a summary of Maslow's need hierarchy.<sup>24</sup>

- level 1: physiological needs, e.g. hunger, thirst
- level 2: safety needs, e.g. security, stability
- level 3: belongingness and love needs, e.g. affection, identification
- level 4: esteem needs, e.g. prestige, self respect
- level 5: need for self-actualization

Applying his hierarchy to the study of open spaces, we find no equivalence for a level one need, because outdoor spaces provide physiological amenities rather than meet necessities. At the next level we have our security category which refers to freedom from real or perceived threats on one's person or property. Maslow's "safety needs" encompasses our security category. Belongingness and love needs at the third level are social needs. Our community category refers to that type of need. At the fourth level, we have the maintenance category. Much has been written about the importance of maintenance in housing sites. Maintenance, which includes upkeep and repair, strongly affects the prestige of the development<sup>25</sup> and by implication the status of the residents.

The highest level of Maslow's hierarchy is self-actualization needs. Various theories of personality view this as a basic human tendency toward maximal realization of one's potentialities.<sup>26</sup> All our remaining categories belong at this level. "Image" is the category which deals with an individual's aesthetic and life prospect expectations. We can see that there is close correspondence between "image" and the preceding definition of self-actualization.

"Access to outdoor spaces" widens the range of recreational choices

of individuals, and therefore is considered a self-actualization need. The issue is not outdoor spaces but convenient and appropriate outside spaces. Children, for example, will seek out places interesting to them if none are provided. Access to nearby, clean, safe, varied, surprising spaces enriches the child's development. Such places meet the need for a sheltered place for the child to learn about himself and the world.

Privacy is a need for control of visual, aural, and physical intrusion in order to allow an individual freedom of self expression. This too relates to self-actualization. Summarizing below:

<u>MASLOW</u>	<u>OPEN SPACE ANALYTIC CATEGORIES</u>
level 1: physiological need	none
level 2: safety need	SECURITY from crime
level 3: belongingness need	COMMUNITY
level 4: esteem need	MAINTENANCE of grounds and equipment
level 5: need for self-actualization	IMAGE (a fit between expectations and reality) ACCESS to outdoor activity spaces PRIVACY from intrusion

Our study categories come from commonly used design concepts which we have redefined. Maslow's hierarchy helps us fit them into a framework usable for the study of open spaces.

## THE INFLUENCE OF DESIGN

Maslow's hierarchy divided our postulated categories into two basic groups. The first group includes the three categories at the self-actualization level. The second group encompasses the three remaining categories which are at lower need levels. We intend to show that categories

of the first group--image, privacy, and access--are strongly influenced by design decisions, whereas categories of the second group--maintenance, community, and security--are only weakly influenced by design.

Let us first look at a typical development process of subsidized housing in order to identify the agents of influence and their relationship to each other.

An early influence is the regulatory agency who funds the development. Agencies such as HUD, FHA, and MHFA specify conditions that developers must meet in order to receive subsidy. By holding the powers of the purse, the agency exercises considerable control over the developer. Most agencies also have tenant selection procedures that determine the types of residents who can be housed in their developments. Public housing projects, for example, are restricted by law to house only low income people. None of our three study sites are so restrictive. Each has some mix of income groups and family types suggested by the developer and approved by the regulatory agency. In general, applicants are housed on a first-come-first-served basis until the predetermined mix is attained. Thus, the residents are a group with little in common except their qualifications for subsidized housing.

Since the "residents" do not arrive until the development is built they normally have little influence in the development process. The development process. The developer, with the regulatory agency's approval, already has chosen an architect, designed and built the development, and hired a management company. Then all of a sudden the mix of diverse families are grouped under the title "residents". Ironically, as we will later show, it is on this "group" that so much of the success of the development will depend.

The regulatory agency is an early and fairly remote influence on the development. The developer is an intermediate influence in that he suggests a resident mix, as well as hires the architect and the management company. It is, then, the architect who designed the development, the management who runs it, and the residents who live in it, who are potentially the most direct influences on the workability of the development. Now we can look at the design's influence on the various categories.

In the maintenance category, design exerts only a weak influence because its contributions are passive. An architect can design a development that is easy to maintain -- with hardy plants, durable materials, few irregular nooks or litter traps. He can even arrange the site to encourage possessiveness toward spaces. But, for all the aids and encouragements, it is either the management or the residents who actively do the maintenance work. IMAI (1973) makes a convincing case that management and the residents each has a complementary, essential, and different tasks in a total maintenance program.

Newman's Defensible Space has done much to publicize the idea that design has a strong influence on crime prevention. His suggestions include the use of markers to distinguish territories, the limiting of access to entrances and stairways, and arranging windows and lighting so as to permit better surveillance.<sup>27</sup> His design measures do enhance what we call "territorial privacy", and its effect on security depends on the operation of other factors. The Kitty Genovese incident where a woman was murdered while her neighbors watched illustrate that good surveillance does not necessarily lead to good security. In that incident, a social ethos of non-involvement, and a cumbersome and ineffective system of justice bore more heavily on security in that neighborhood than any design

feature. The residents, on the other hand, can exert a strong influence on security if they choose to be involved -- to report crimes, to warn off strangers, to help neighbors. Even the management can exert stronger influence than design by simply hiring security guards.

In the community category, once again it is the residents who can develop the sense of community. The architect can design to enhance territory which in turn encourages socializing and friendships. But the influence exerted by design is considered indirect since it works through another category (Actually, the subcategory -- territorial privacy). Management is only able to exert a weak influence on "community" by initiating and supporting various tenant activities. This is because the participation in activities does not by itself create community spirit. Participation, however, can lead to identification of common interests that is a necessary step toward a community spirit.

In all three categories associated with lower or more basic needs as postulated by Maslow, design solutions only exert either a weak or an indirect influence. We call these categories -- maintenance, security and community -- extradesign categories.

"Image", unlike the three previous categories, is a category where the architect can exert a strong influence. The architect can design to meet some of the expectations of his potential residents. For example, in the choice of what types of open spaces to provide in a development, an architect is aided by studies which have discerned patterns of preferences among people of different income groups. Low income families often place their priority on a private yard.<sup>28</sup> Middle income families who have had a private yard may prefer some form of shared open space.<sup>29</sup> Upper in-

come families may even accept very little non-public space if their aversion to do maintenance work has made to condominium an attractive form of housing.<sup>30</sup> Even the elusive concept of attractiveness has some definition from the various studies that have identified its open space components.

Residents, too have an influence on "image". But that influence is weak. Clare Cooper argues that minor tenant personalizations such as colors, siding, awnings, flower beds, fences, play an important role in a resident's image of his dwelling environment.<sup>31</sup> Nevertheless, the influence of design decisions are still primary. "Several housing-evaluation studies have shown that the exterior of individual dwellings, matters less to residents than the layout and landscaping of the scheme as a whole."<sup>32</sup>

In the privacy category, design decisions about location of paths, spacing of buildings, proximity of noisy play areas, buffer spaces near the dwelling have a strong influence on both visual and aural privacy. The architect's influence in these areas is preventative. The resident's or the management's influence is only curative and ad hoc. Some examples of ad hoc measures are the adding of window blinds, the building of fences or the planting of screening plants. None of which, incidentally, can help significantly in alleviating a noise problem.

In the subcategory of territorial privacy, the architect decides the number of units sharing a space, the amount of space shared, the form of entrance access, window orientations. Once again, these contribute more substantively to territory than definitions or boundaries added to create territories in an undifferentiated space.

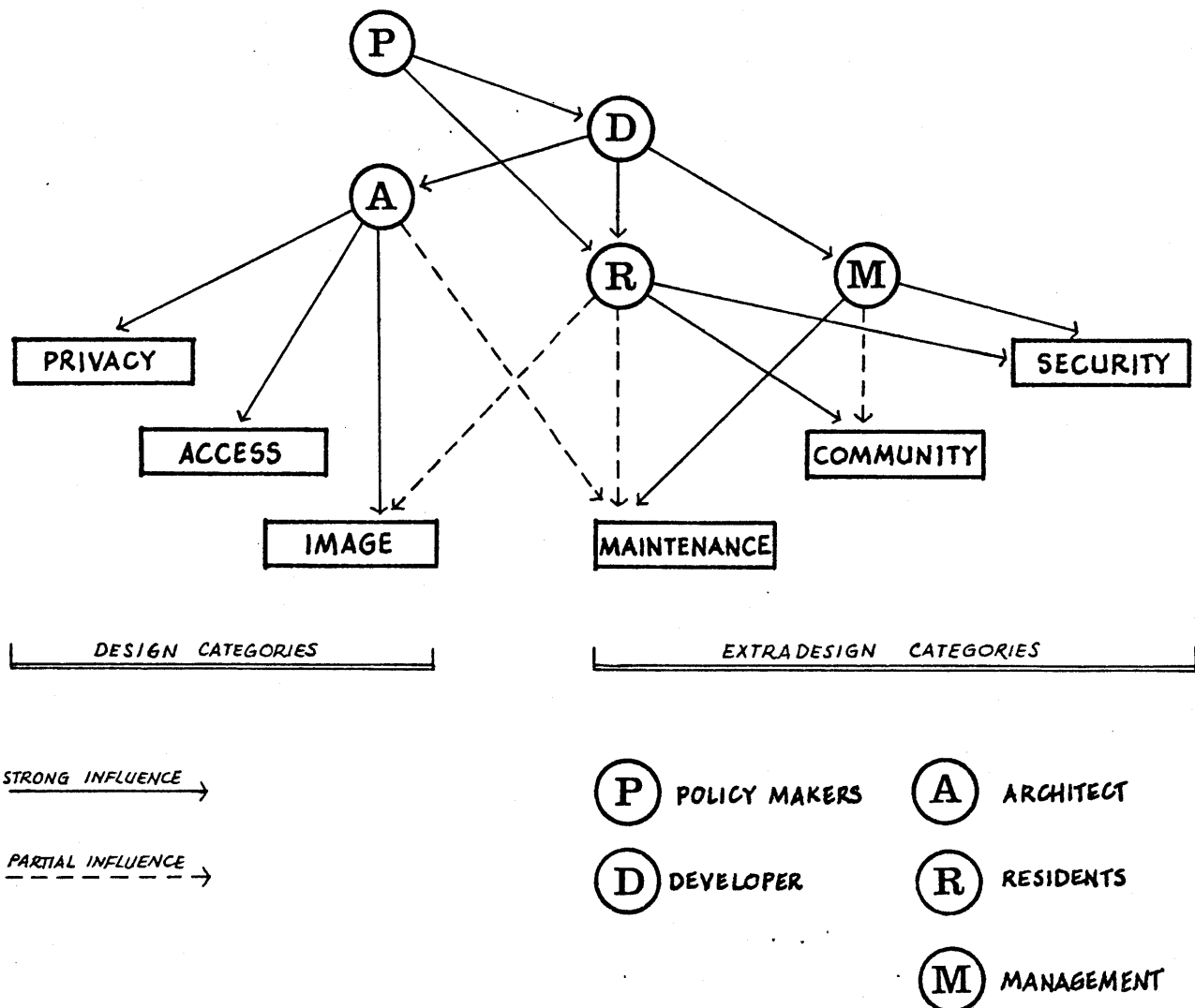
In the last category, that of "access to outdoor activity" spaces, it is the architect's site plan that determines what types of spaces are a-

available at what location. While management may intervene with rules and new boundaries, those influences are minor, temporary, and often ignored.

Thus, the three categories associated with Maslow's self-actualization need are all strongly influenced by design. We call these categories -- image, privacy, and access -- design categories. FIGURE 12 summarizes the relationships between agents of influence and the six categories of this study.

FIGURE 12

ACTORS IN A TYPICAL DEVELOPMENT PROCESS  
AND THEIR INFLUENCE ON THE SIX CATEGORIES





## SUMMARY

This chapter has set forth the conceptual framework of the thesis. Six categories of concerns were postulated to be important to the explanation of overall satisfaction with open spaces in housing. The accuracy of that claim will soon be tested. Meanwhile, the six categories were divided into two groups. One group called "design categories" included three categories that analysis of a typical housing development process showed to be strongly influenced by design decisions. The other group, which included the remaining three categories, were seen to be only weakly linked to design decisions. Matching each of the six categories to needs on the Maslow need Hierarchy showed that all design categories are related to Maslow's highest need -- self-actualization. The extra design categories, on the other hand, related to lower level or more basic needs.

## CHAPTER FOUR THE ANALYSIS

In the previous chapter, six categories of elements were postulated. The categories were then divided in two groups -- design categories and extradesign categories. Design categories include image, privacy, and access. Extradesign categories include maintenance, security, and community.

In this chapter, a method that demonstrates how the level of overall satisfaction is affected by varying levels of satisfaction with design categories and extradesign categories is presented. Data from non-random informal interviews is used to show how the method works. Any substantive results, however, from such a data base are not totally conclusive and should be considered as suggestions for further research.

### A SUMMARY OF DATA TO BE USED IN THE ANALYSIS

In the analysis that follows, selected questions were used from each of the 43 interviews. One question was chosen for each category or subcategory in order to provide the necessary information on the tenant's satisfaction with that category or subcategory. (See Table 4 for a tabulation of the answers to those questions.)

TABLE 4  
SUMMARY OF THE DATA USED IN THE DATA ANALYSIS

CATEGORY: Subcategory		QUESTIONS	USED	RESPONSES				
				5	4	3	2	1
EXTRADESIGN CATEGORIES	MAINTENANCE	How do you feel about the upkeep if common spaces?	*	9 (21%)	9 (21%)	7 (16%)	10 (23%)	8 (19%)
				YES		NO		
	SECURITY	Do you feel safe living in this place?		27	(63%)	16	(37%)	
	COMMUNITY: Friendliness Neighbors Behavior	In general, would you say this is a friendly place to live? How do you feel about the way people around here us the commom open spaces?	**	36 14	(84%) (32%)	7 29	(16%) (68%)	
DESIGN CATEGORIES	IMAGE: Attractiveness Pref. of Present over Previous	Do you feel this site attractive? Do you like it better here or the last place you lived?	***	14 26	(32%) (60%)	29 17	(68%) (40%)	
	PRIVACY: Visual Aural Territorial	Are you bothered by people looking right in? Are you bothered by noise coming from the common spaces? Do you think this is a good size for a housing group?		13 25 19	(30%) (58%) (44%)	30 18 24	(70%) (42%) (56%)	
	ACCESS: For Children For Adults and Elderly To Spaces Outside of the Site	Are there on-site places for your children to play? Do you feel there is adequate outdoor space for your activities? Do you have adequate and convenient parking?		29 21 39	(81%) (49%) (91%)	7 23 4	(19%) (51%) (9%)	
				HIGH		AVERAGE		LOW
	OVERALL SATISFACTION	Overall how satisfied are you with the outdoor spaces provided here?		17	(40%)	17	(40%) 9 (20%)	

\*Responses to the "Maintenance" Question are 5=excellent, 3=average, 2=poor, 1=terrible.

\*\*Responses to the "Neighbor's Behavior" Question are YES = yes, they take good care, NO = no, they do not take good care.

\*\*\*Responses to the "Preference of Present over Previous" Question are YES = prefer present, NO = prefer previous.

## THE AGGREGATION OF CATEGORIES

We start the analysis by using a graph to demonstrate the effects of the two groups of categories on overall satisfaction. In this graph, satisfactions with extradesign categories are represented on the x-axis and satisfactions with design categories on the y-axis. Each point on the graph represents one interviewed resident. Each point, coded accordingly to the respondent's level of overall satisfaction, is visually distinguished from points representing a different satisfaction level.

We see from Table 4 that satisfactions with design categories are represented by eight responses and satisfactions with extradesign categories are represented by four responses. The task of aggregation involves combining the eight responses under the design categories into one number that can be located on the y-axis. Similarly, the four responses under the extradesign categories have to be aggregated onto one number for the x-axis.

### NUMERICAL CODING OF VERBAL RESPONSES

Verbal responses have to be coded as numbers. All responses, except those connected to "maintenance", to "overall satisfaction", have been evaluated along with relevant tenant comments to determine whether the response was either positive or negative.\* An answer is considered positive if it evaluates the site of site elements positively. For example, unqualified "yes" answers to the following questions are considered posi-

\* Coding instructions in APPENDIX C specify how to code responses that were qualified by additional comments.

tive:

- Do you feel safe living in this place?
- In general, would you say this is a friendly place to live?
- Do you think this is a good size for a housing group?
- Are there on-site places for your children to play?
- Do you feel there is adequate outdoor space for your families activities?
- Do you have adequate and convenient parking?

Similarly, a "prefer present" type answer is considered positive in response to "Do you like it better here or the last place you lived?" On the other hand, for response to the following questions, a "no" answer would be considered a positive answer:

- Are you bothered by people looking right in?
- Are you bothered by noise coming from the common open spaces?

All positive answers are coded numerically as "1". All negative answers are coded as "0".

Responses to the "maintenance" question are not simply positive or negative, but are coded on a five point scale. For "maintenance", a code of "5" means "excellent maintenance" and a code of "1" means "terrible maintenance".

Responses to the overall satisfaction question is not coded by a number at all. Instead, visually distinguishable graphic symbols are used to represent different levels of overall satisfaction. A black dot (●) represents a high overall satisfaction with the site open spaces. A blank square (□) represents average satisfaction. And a black star (★) represents low satisfaction.

It may be helpful to illustrate the translation responses into numerical codes by going through the translation using the data from three typical tenant interviews.

Respondent A is a 73 year old woman. She lives in a Pine grove two bedroom apartment together with her infirm mother and her older brother. Respondent A is a vivacious and active woman who misses the outdoor recreation areas she had in her previous Cape Cod home.

Respondent B is a black woman in her late twenties. She lives in a Roxse Homes three bedroom apartment together with her husband and two young children. Respondent B's husband owns a neighborhood variety store. The business is prospering, so that the family has hopes to move out of their Roxse Homes apartment to a townhouse.

Respondent C is a black woman in her middle thirties. She lives in a Warren Gardens three bedroom townhouse together with her husband and three children, aged seven to thirteen. Her townhouse unit is right off one of the larger and more active parking courts at Warren Gardens so that her family enjoys many of the activities that center around the parking court, such as barbeques, street football or hockey games.

Table 5 illustrates the translation of these tenants' responses into numerical codes.

#### AGGREGATING THE CODED RESPONSES

The numerical codes presented in Table 5 will eventually be weighted by predetermined coefficients then added together to obtain x-values and y-values for our graph. The weighting scheme, (TABLE 6), we use is based on the assumption that all the six categories are equally important in determining a resident's level of overall satisfaction. Each category is thus given an identical weight of 1.00. Each subcategory within a category

TABLE 5

## ILLUSTRATION OF THE TRANSLATIONS OF VERBAL RESPONSES TO NUMERICAL CODES

QUESTIONS USED	TENANT A		TENANT B		TENANT C	
	VERBAL RESPONSE	NUMERICAL CODE	VERBAL RESPONSE	NUMERICAL CODE	VERBAL RESPONSE	NUMERICAL CODE
How do you feel about the upkeep of the common spaces?	Excellent	5	Terrible	0	Poor	2
Do you feel safe living in this place?	Yes	1	No	0	Yes	1
In general, would you say this is a friendly place to live?	Yes	1	Yes	1	Yes	1
How do you feel about the way people around here use the common open spaces?	Yes	1	No	0	Yes	1
Do you feel this site attractive?	Yes	1	No	0	No	0
Do like it better here or the last place you lived?	Previous	0	Present	1	Present	1
Are you bothered by people looking right in?	No	1	Yes	0	No	1
Are you bothered by noise coming from the common open spaces?	Yes	0	Yes	0	Yes	0
Do you think this is a good size for a housing group?	No	0	No	0	No	0
Are there on-site places for your children to play?	*	*	Yes	1	Yes	1
Do you feel there is adequate outdoor space for your activities?	Yes	1	Yes	1	No	0
Do you have adequate and convenient parking?	Yes	1	Yes	1	Yes	1
Overall how satisfied are you with the outdoor spaces provided here?	High	●	Low	★	Average	□

\* Respondents who have no children, do not answer the question on children's play spaces.

is given a weight determined by the total category weight of 1.00 divided by the number of categories. Since not all categories have the same number of subcategories, the computed weight of subcategories under different categories are not always of the same weight either. For example, comparing two design categories, "image" and "privacy", we see that "image" has two subcategories, while "privacy" has three. Each image subcategory therefore receives a weight of .50 while each provacy subcategory receives only .33.

All extradesign categories are given a weight of 1.00. "Maintenance" is weighted slightly differently. While the highest positive evaluation for the maintenance category is also weighted 1.00, each step down on its five response scale is given a proportionately smaller weight. Thus, "Excellent maintenance" receives the full weight of 1.00. "Good maintenance" would have a weight of .75, "Average maintenance" would have .50, "Poor maintenance" would have .25 and "Terrible maintenance" would have a weight of zero.

The sum of all the weighted codes is roughly proportional to the number of positive answers.\* Positive answers, it should be emphasized, are simply positive evaluations of categories of subcategories. For example, when we add up all the positive evaluations of the three extradesign categories, and subcategories, the sum reflects satisfactions (positive evaluations) with extradesign categories. The same is true for the design categories and subcategories.

\* Negative answers, coded "0", have no effect on the sum regardless of the coefficient (or weight).



TABLE 6

## WEIGHTING SCHEME FOR THE ANALYTIC GRAPH

CATEGORY	SUBCATEGORY	WEIGHT FOR THE SUBCATEGORY	TOTAL WEIGHT FOR THE CATEGORY
MAINTENANCE	-	-	1.00
SECURITY	-	-	1.00
COMMUNITY	Friendliness	.50	1.00
	Neighbor's Behavior	.50	
IMAGE	Attractiveness	.50	1.00
	Pref. of Pres. over Prev.	.50	
PRIVACY	Visual	.33	1.00
	Aural	.33	
	Territorial	.33	
ACCESS	For Children	.33	1.00
	For Adults and Elderly	.33	
	To Spaces Outside of the Site	.33	

TABLE 7 illustrates how the weighting scheme works on the coded responses of our three sample respondents. The value for each category or subcategory is the product of the weight and the corresponding code. The sum of all the design subcategory values is the value for the design categories (y-value). The sum of the extradesign category and subcategory values is the value for the extradesign categories (x-value).

## THE ASSUMPTIONS OF THE GRAPH

Our analytic graph, which will display the coded and weighted responses of our 43 interviews, has two axes. Satisfactions (aggregated positive responses) with extra design categories is represented as a value on the x-

TABLE 7

## ILLUSTRATION OF THE USE OF THE WEIGHTING SCHEME

CATEGORY	WEIGHT	TENANT A		TENANT B		TENANT C	
		CODE	VALUE	CODE	VALUE	CODE	VALUE
MAINTENANCE	1.00	5	1.00	1	0	2	0.25
SECURITY	1.00	1	1.00	0	0	1	1.00
COMMUNITY: Friendliness	0.50	1	0.50	1	0.50	1	0.50
COMMUNITY: Neighbor's Behavior	0.50	1	0.50	0	0	1	0.50
		x value=3.00		x value=0.50		x value=2.25	
IMAGE: Attractiveness	0.50	1	0.50	0	0	0	0
IMAGE: Pref. of Present over Previous	0.50	0	0	1	0.50	1	0.50
PRIVACY: Visual	0.33	1	0.33	0	0	1	0.33
PRIVACY: Aural	0.33	0	0	0	0	0	0
PRIVACY: Territorial	0.33	0	0	0	0	0	0
ACCESS: For Children	0.33	*	*	1	0.33	1	0.33
ACCESS: For Adults and Elderly	0.33	1	0.66	1	0.33	0	0
ACCESS: To spaces outside of site	0.33	1	0.33	1	0.33	1	0.33
		y value=1.82		y value=1.50		y value=1.50	
OVERALL SATISFACTION		HIGH	●	LOW	★	AVE.	□

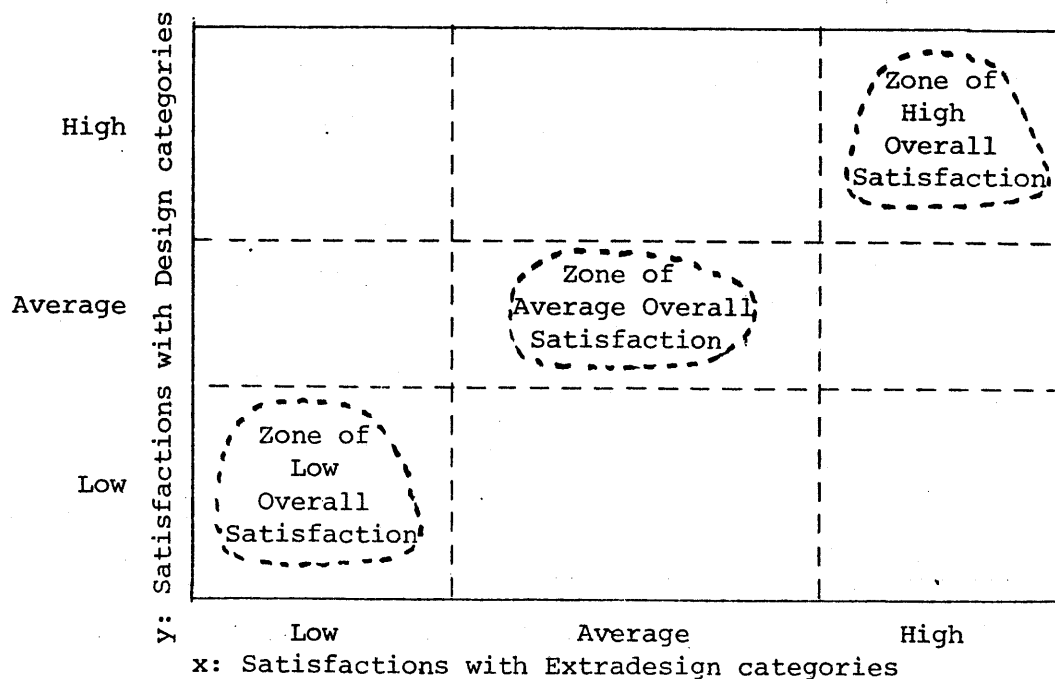
\*For respondents without children, the access subcategory, "access for the children", is not coded. Its weight is, however, added on to the weight of the access subcategory, "access for the adults and the elderly".

axis. Satisfaction with design categories is represented on the y-axis. We want to use the graphs to see whether points of the different overall satisfaction levels naturally cluster into distinct zones. Therefore we are assuming that the x-values and the y-values each have non-overlapping zones that uniquely determine overall satisfaction levels. We will now consider what distribution of points on our graph is necessary to support the above assumption.

FIGURE 13 is a schematic graph with the x-axis and the y-axis each divided hypothetically into three regions of satisfactions -- high, average, and low. The regions do not necessarily have to be equal. We see three zones on the schematic graph that correspond to three levels of overall satisfaction. Points of a particular level of overall satisfaction must fall in its own zone in order to support our stated assumption.

FIGURE 13

SCHEMATIC GRAPH ILLUSTRATING POINT DISTRIBUTION PATTERNS  
REQUIRED TO SUPPORT STATED ASSUMPTIONS



On each axis there must be three distinct regions corresponding to each of the three overall satisfaction levels. None of the zones are allowed to extend through the length of either axis. If the zones in the actual graphs should do so then one or both of the categories do not uniquely determine the levels of overall satisfaction. This pattern is what we would expect, had we assumed that only the extradesign categories determine the overall satisfaction levels and that the design categories are unimportant. The three zones would be then three vertical bars. On the other hand, if we had assumed that only the design categories are determinants, then the three zones would be horizontal bars.

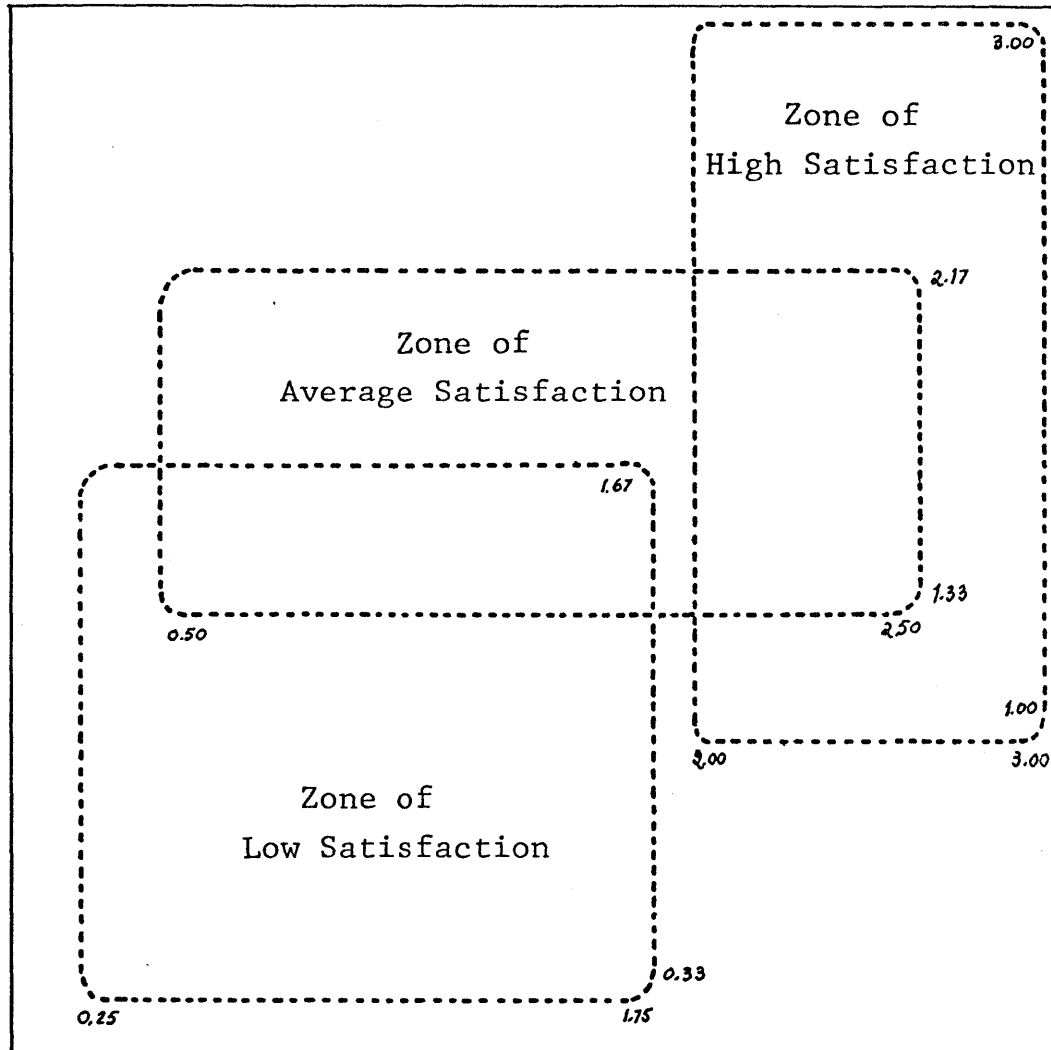
FIGURE 14 shows our data displayed on the analytic graph.

## THE INTERPRETATION OF THE GRAPH

The distribution of points on the graph show that our assumption of uniqueness has not been substantiated by the data. The first overlay on FIGURE 14 shows that three zones corresponding to different levels of overall satisfaction can be identified. But the zones overlap considerably.

Turning first to the distribution of average overall satisfaction points ( $\square$ ), which are shown separately on the second overlay, we see that the zone of that satisfaction level is in the shape of a horizontal bar. This shape is indicative that satisfactions with extradesign categories do not uniquely determine average overall satisfaction. Unfortunately, satisfactions with the design categories do not uniquely determine this satisfaction level either because we see through the overlays that the narrow region on the y-axis where the average satisfactions occur is overlapped

FIGURE 14a

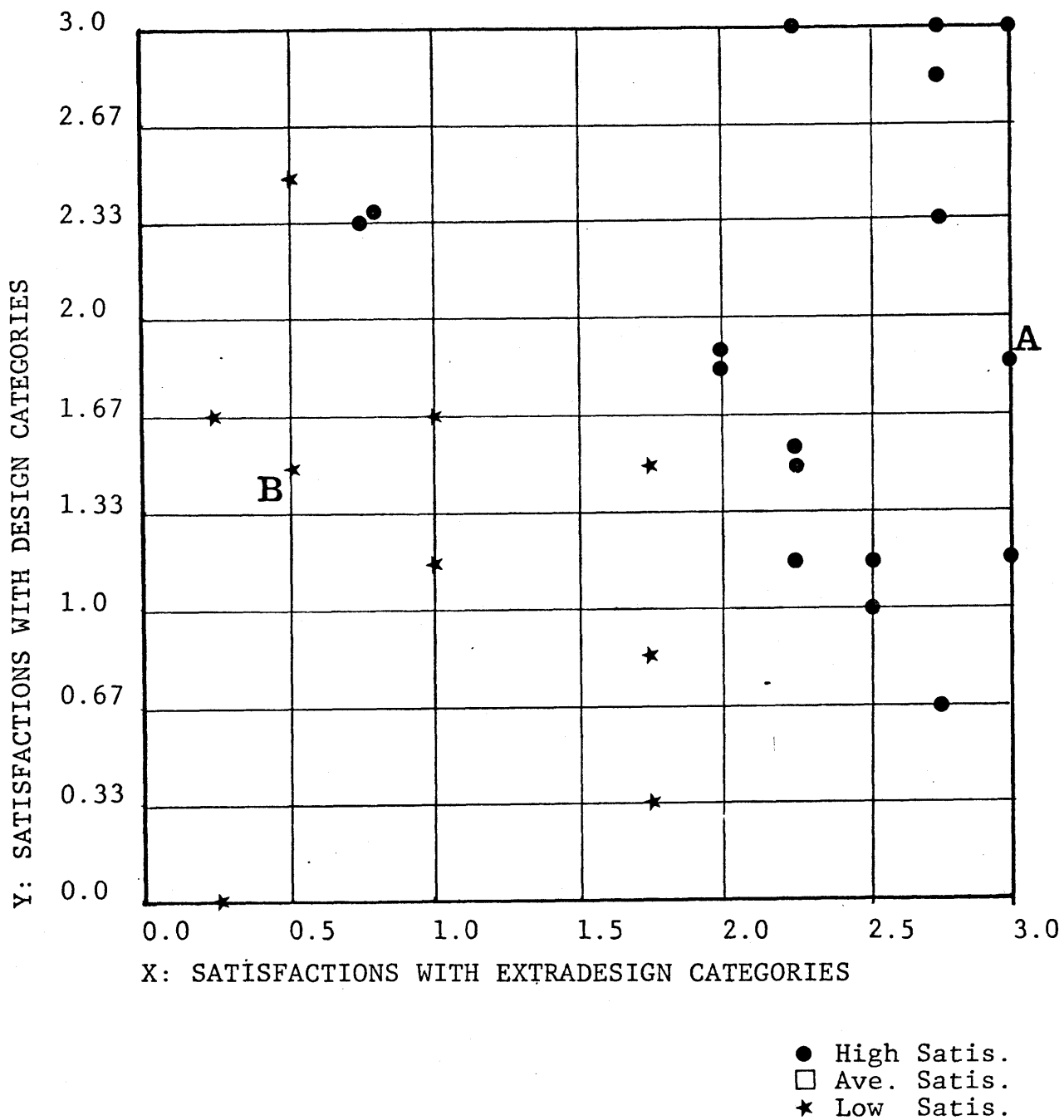


OVERLAY ONE -- Three Zones Corresponding to the Three Levels of Overall Satisfaction

A scatter plot showing the distribution of 18 sampling stations (represented by squares) in the western North Pacific. The stations are numbered 1 through 18. A label 'C' is placed near station 15. The plot shows a general trend of stations moving from the northwest towards the southeast, with a cluster of stations (15, 16, 17, 18) in the southeast.

64

FIGURE 14  
THE ANALYTIC GRAPH



by the zones of the other levels.

Consider now the ranges of the three zones along the x-axis. If we remove the overlays and look only at the distribution of the points of high and low overall satisfactions, we notice that there is a clear separation between the zones of the two levels of satisfaction. That demarcation is at about  $x = 1.85$ . This separation indicates that if we consider these two groups alone, the x-values can distinguish them uniquely.

While the large areas of overlap between the three zones indicate that neither the x-values nor the y-values uniquely determine the levels of overall satisfactions, there is reason to be hopeful. The fact that there are identifiable zones instead of random distribution suggests that a more precise data gathering instrument may be able to lessen the areas of overlap. Our purpose in using the graphs has been to demonstrate a simple method of checking whether or not satisfactions with groups of categories can uniquely determine overall satisfaction.

Let us now look at the individual categories and subcategories and consider whether or not each relates to the levels of overall satisfaction. TABLE 8 is a comparison of the positive responses for each category and subcategory according to levels of overall satisfaction. A chi-square statistic is calculated from the two-way contingency table<sup>1</sup> of each category or subcategory in order to test the relationship between categories or subcategories and overall satisfaction.

Since the chi-square ( $\chi^2$ ) values (all on two degrees of freedom) measure the dependence of the overall satisfaction level on the responses to each of the categories or subcategories, therefore the chi-square values enable us to rank the categories and the subcategories in order of their importance in determining the overall satisfaction levels.



TABLE 8

A COMPARISON OF CATEGORIES AND SUBCATEGORIES PERCENTAGE OF POSITIVE RESPONSES BY LEVEL OF SATISFACTION AND CHI-SQUARE VALUES

		OVERALL SATISFACTION			CHI-SQUARE OF THE RELATIONSHIP BETWEEN CATEGORIES, SUBCATEGORIES AND OVERALL SATISFACTION
		HIGH	AVERAGE	LOW	
		N=17	N=17	N=9	
EXTRADESIGN CATEGORIES	1 MAINTENANCE	14 (82%)	3 (18%)	1 (11%)	$\chi^2_2 = 19.06$ $P < 0.005$
	2 SECURITY	15 (88%)	9 (53%)	3 (33%)	$\chi^2_2 = 8.76$ $0.025 > P > 0.01$
	3 COMMUNITY: Friendliness	16 (94%)	15 (88%)	5 (56%)	$\chi^2_2 = 6.8113$ $0.05 > P > 0.025$
	4 COMMUNITY: Neighbor's Behavior	7 (41%)	4 (24%)	3 (33%)	$\chi^2_2 = 1.21$ $0.5 > P > 0.25$
DESIGN CATEGORIES	5 IMAGE: Attractiveness	10 (59%)	4 (24%)	3 (33%)	$\chi^2_2 = 10.33$ $0.01 > P > 0.005$
	6 IMAGE: Pref. of Pres. over Prev.	11 (65%)	10 (59%)	5 (56%)	$\chi^2_2 = 0.24$ $0.9 > P > 0.75$
	7 PRIVACY: Visual	15 (88%)	11 (65%)	4 (44%)	$\chi^2_2 = 7.61$ $0.05 > P > 0.025$
	8 PRIVACY: Aural	8 (47%)	7 (41%)	3 (33%)	$\chi^2_2 = 0.463$ $0.9 > P > 0.75$
	9 PRIVACY: Territorial	7 (41%)	9 (53%)	3 (33%)	$\chi^2_2 = 1.02$ $0.75 > P > 0.5$
	10 ACCESS: For the Children	10 (59%)	14 (82%)	5 (56%)	$\chi^2_2 = 2.87$ $0.25 > P > 0.1$
	11 ACCESS: For the Adults and Elderly	6 (35%)	10 (59%)	5 (56%)	$\chi^2_2 = 2.09$ $0.5 > P > 0.25$
	12 ACCESS: To Spaces Out- side the Site	16 (94%)	17 (100%)	6 (67%)	$\chi^2_2 = 8.10$ $0.25 > P > 0.01$

TABLE 9

RANKING OF CATEGORIES AND SUBCATEGORIES BY THEIR  
IMPORTANCE TO OVERALL SATISFACTION LEVELS

<u>SIGNIFICANT AT 0.01 LEVEL:</u>	MAINTENANCE IMAGE: Attractiveness SECURITY
<u>SIGNIFICANT AT 0.05 LEVEL:</u>	ACCESS: To Spaces Outside of the Site PRIVACY: Visual COMMUNITY: Friendliness
<u>SIGNIFICANT AT 0.20 LEVEL:</u>	ACCESS: For Children ACCESS: For Adults and Elderly
<u>NOT SIGNIFICANT:</u>	COMMUNITY: Neighbor's Behavior PRIVACY: Territorial PRIVACY: Aural IMAGE: Preference of Present over Previous

We note that at the 0.01 level, two out of the four extradesign categories are significant as compared to only one out of the light design subcategories. At the 0.05 level, everything under extradesign except for one subcategory is significant. But only three out of eight design categories are significant. As far as statistical significance is concerned, the extradesign categories as a group appear to be more important to levels of overall satisfaction than the design categories.

The above conclusion supports our original classification of extradesign categories as more basic (lower) level needs in Maslow's need hierarchy.

In summary, this chapter has demonstrated a method of determining whether individual or a group of categories and subcategories are important to overall satisfaction levels. Using the data from our fieldwork we found that extradesign categories appeared more important than design categories. We also were able to rank the categories and the subcategories

according to their importance in determining overall satisfaction levels.  
Given the nature of our data, however, we would suggest further study  
before considering these results conclusive.

## CHAPTER FIVE      THE SYNTHESIS OF FINDINGS

In Chapter Four, data from our fieldwork were analyzed and graphed to demonstrate the relationships of individual and groups of categories on levels of overall satisfactions. In this chapter, we draw on our results as well as relevant findings in the literature in order to examine the effects of the categories on each other. The chapter is divided into sections corresponding to our original six categories. The discussion in each section focuses on the influence exerted by one category. Influence linkages, or relationships between categories that are identified during that discussion will later be presented as a diagram of interrelationships.

In order to facilitate referencing of relationships described in text and later used in the diagram, we will number each relevant statement that follows in the text. The statement number will be underlined and enclosed within parentheses to distinguish it from textual material.

### THE REVIEW OF THE CATEGORIES

## MAINTENANCE

This study, (TABLE 9), supports findings by other studies<sup>1</sup> identifying maintenance as one of the chief determinants of satisfaction with housing. "Maintenance" also has a very central place among the categories of concerns because it directly influences many of the other categories.

"Maintenance" affects the community spirit of a development. A British study found "evidence that good maintenance...leads to higher standards of behavior and a sense of responsibility for common areas<sup>2</sup> (1)." The reason for this as expressed many times by the respondents of this study is that tenants are willing to do their share provided others (especially the management) do theirs.

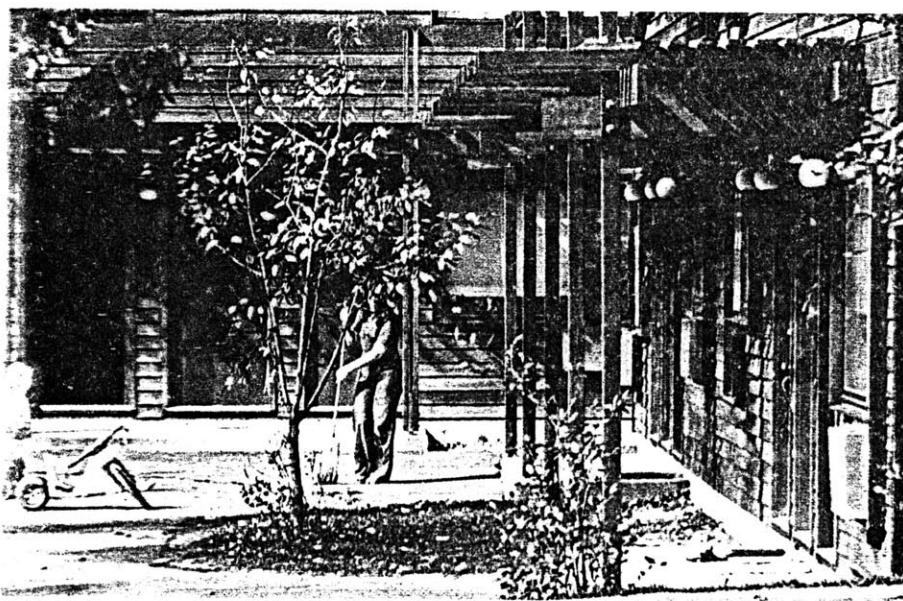


FIGURE 15      A Voluntary Tenant Clean-up at Pine Grove

So poor maintenance will hurt the sense of community among neighbors. It is understandable that if an area is maintained poorly, residents may blame their neighbors whom they judge as irresponsible. Such an attitude

hurts the community spirit. Even outside observers will consider poor maintenance as a sign of division within a neighborhood.<sup>3</sup>

"Maintenance" affects the image category (2). Tenants at all three study sites often evaluated attractiveness (a subcategory of "image") in terms of upkeep. For example, one tenant from Warren Gardens said, "It's OK now, but it could be beautiful if they kept it up." Clare Cooper explains:

Unlike basic design, maintenance was an aspect of the attractiveness of the neighborhood which was a potential and actual source of concern and friction...among tenants...And in this type of milieu (a low income housing development), sources of potential or actual friction figure much more frequently in people's thoughts and feelings than do pleasure-giving features of the environment...<sup>4</sup>

"Maintenance" also affects "access to activity spaces". IMAI (1973) studied the litter problem in communal open spaces. He found that if litter is not picked up, even more will accumulate.<sup>5</sup> This is because people who litter tend to do so where existing litter already indicates a lack of concern for the space. It is ironic that litter, which is itself a by-product of space use, may eventually choke off the very use of a space that caused litter by creating a health and safety hazard. Thus refuse collection, a part of maintenance, influences whether areas will likely be used for regular activities (3). Conversely, a well maintained area discourages littering by transmitting a message that such a space is claimed.

## SECURITY

The safety of the neighborhood around a site has some effect on how secure people feel living in their developments. But neighborhood condi-

tions are only part of the explanation of resident's perceptions of security. This study found that the Roxbury respondents reported poor security while the Brockton respondents did not. Roxbury is considered a high crime area while Brockton is not. But within our two Roxbury sites, there was considerable variation on the proportion of respondents who did not feel secure. Almost all (93%) of the Warren Garden respondents felt their development insecure, compared to the quarter (23%) of Roxse Homes respondents.

The difference in proportions can be explained by considering the sources of the respondents security. During our interviews, many Warren Gardens respondents pointed to self installed security devices as their means of self-protection. At Roxse Homes, however, management does not allow the tenants to install additional protection. The management believes that locks, window bars, and alarms result in a false security based on self-preservation alone. Instead the management encourages collective responsibility that implies tenant reliance on each other instead of on passive mechanical devices. The relatively low crime rate at Roxse Homes is one indication of the success of this emphasis. Another indication of the importance of collective responsibility is its effects on perceived security. This will be discussed later under "community".

"Security" as a category exerts influence on the access to and the use of potential activity areas (4). Most parents will not allow their children in areas that will expose children to crime or to people who might be bad influences. Even adults would likely avoid such places of high crime risk. And the elderly are particularly vulnerable because of their lowered physical capabilities. Thus we see that potential activity spaces for the above age groups will probably not be used if users might be subjected to an in-

creased risk of crime there.

"Security" also affects "visual Privacy" (5). The results from work done at our two Roxbury sites provide a good illustration.

The designers of Warren Gardens created transition zones between the dwellings and the more public areas. A dwelling's entrance there is often next to a semipublic sidewalk elevated from more public areas, (FIGURE 16). This path is shared by only a few families. Sometimes, the entrance is off

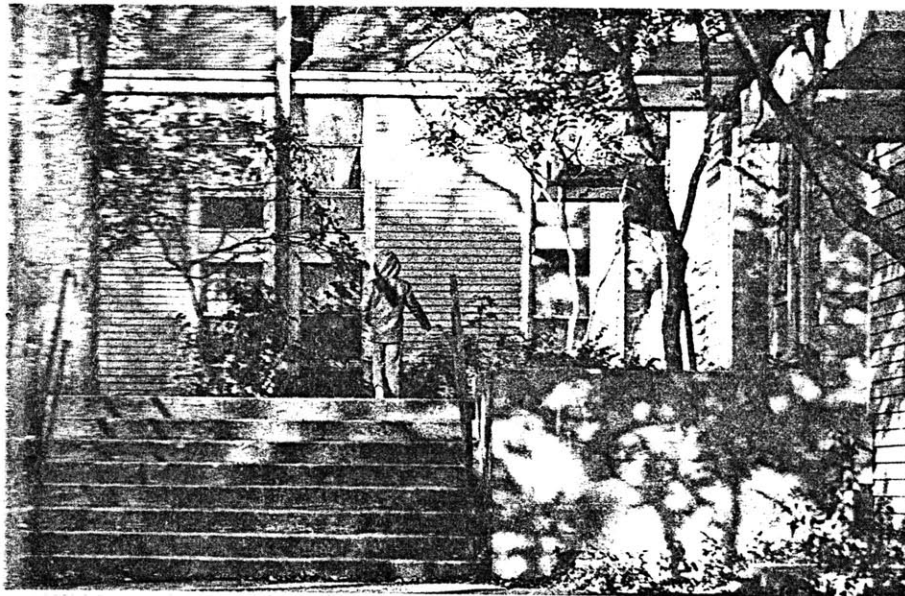


FIGURE 16 A Semi-private Walkway at Warren Gardens

the sidewalk of a parking lot. But Warren Gardens tenants consider these parking courts<sup>\*</sup> less "public" than the streets from which they branch. In the other site, Roxse Homes, many apartments do not have adequate separa-

<sup>\*</sup> The parking courts are called "streets" and are the organizational unit of informal activities like clean-ups, football games, and street hockey.



tion from public areas. Almost half of Roxse's ground floor apartments have windows right next to the public sidewalks of Kendall and Hammond Streets. This juxtaposition of the very private against the very public does not occur at Warren Gardens. All groundfloor units next to a public street in Warren Gardens are separated from the street by either a fenced yard or an unfenced yard at a different elevation from the street.

So, it might be expected that Roxse Homes would have a higher proportion of ground floor respondents with visual privacy problems than Warren Gardens. However, the opposite appeared to be true. None of the four ground floor respondents at Roxse said they had visual privacy problems. But eleven out of fourteen respondents at Warren Gardens felt bothered by people looking in to their apartments. It is relevant to point out that dwellings at both sites had blinds and curtains. Apparently, neither the relation to public areas nor window screening explains tenant's evaluations of visual privacy. The interviews provide a clue, because the question of visual privacy often brought up comments about house break-ins, additional locks, and steel meshes for the windows. This suggests that visual privacy was interpreted in relation to a need to protect homes from burglary. Thus, given similar circumstances, tenants who feel they are in areas of poor security will be more likely to be sensitive to a lack of visual privacy than tenants who feel they live in a secure place.

## COMMUNITY

Of the two "neighbor variables" thought to be important to housing sat-

isfaction, only "friendliness" was shown in this study to be significantly related to overall satisfaction, (TABLE 9). "Neighbor's behavior" did not appear to be important, possibly due to the choice of the interview question.

One interesting finding of this study is that the quality of friendliness does not depend on an individual's number of acquaintances or friends. An individual will consider a place "friendly" if he feels that his neighbors are willing to meet his expectations for "friendly" behavior.

TABLE 10

NUMBER OF ACQUAINTANCES AND OF FRIENDS AS INDICATORS OF FRIENDLINESS  
(TOTAL RESPONDENTS: Pine Grove 16, Warren Gardens 14, Roxse Homes 13)

SITE	RESPONDENTS WHO FELT THE SITE FRIENDLY		RESPONDENTS WHO WERE ACQUAINTED WITH AT LEAST HALF OF THEIR NEIGHBORS		RESPONDENTS WHO HAD AT LEAST A COUPLE OF FRIENDS AMONG THEIR NEIGHBORS	
	YES	NO	YES	NO	YES	NO
PINE GROVE	12 (75%)	4 (25%)	13 (83%)	3 (17%)	9 (58%)	7 (42%)
WARREN GARDENS	11 (79%)	3 (21%)	9 (64%)	5 (36%)	10 (73%)	4 (26%)
ROXSE HOMES	13 (100%)	0 (0%)	1 (8%)	12 (92%)	2 (15%)	11 (85%)

TABLE 10 shows that there is no correspondence between the proportion of respondents who felt their neighbors friendly and the number of their acquaintances or their friends.

Both Warren Gardens and Pine Grove grouped dwelling entrances around common courtyards. This arrangement facilitated neighbor's getting acquaint-

ted, for example, as they accessed through or used the common courtyards (FIGURE 17). This fact helps explain the large percentage of people in those two sites who knew at least half their adjacent neighbors. (Half the adjacent neighbors means about fifteen to twenty families in the Pine Grove or Warren Gardens courtyards.)

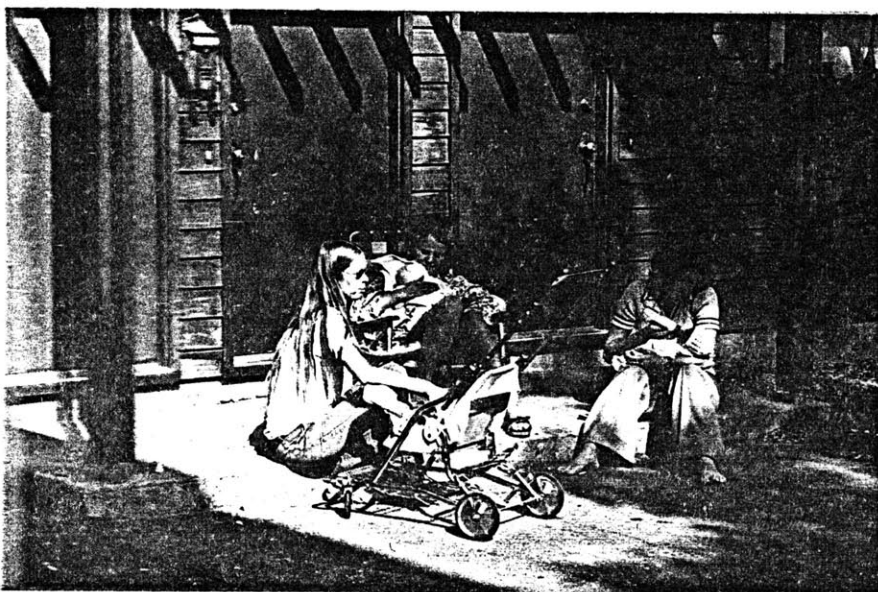
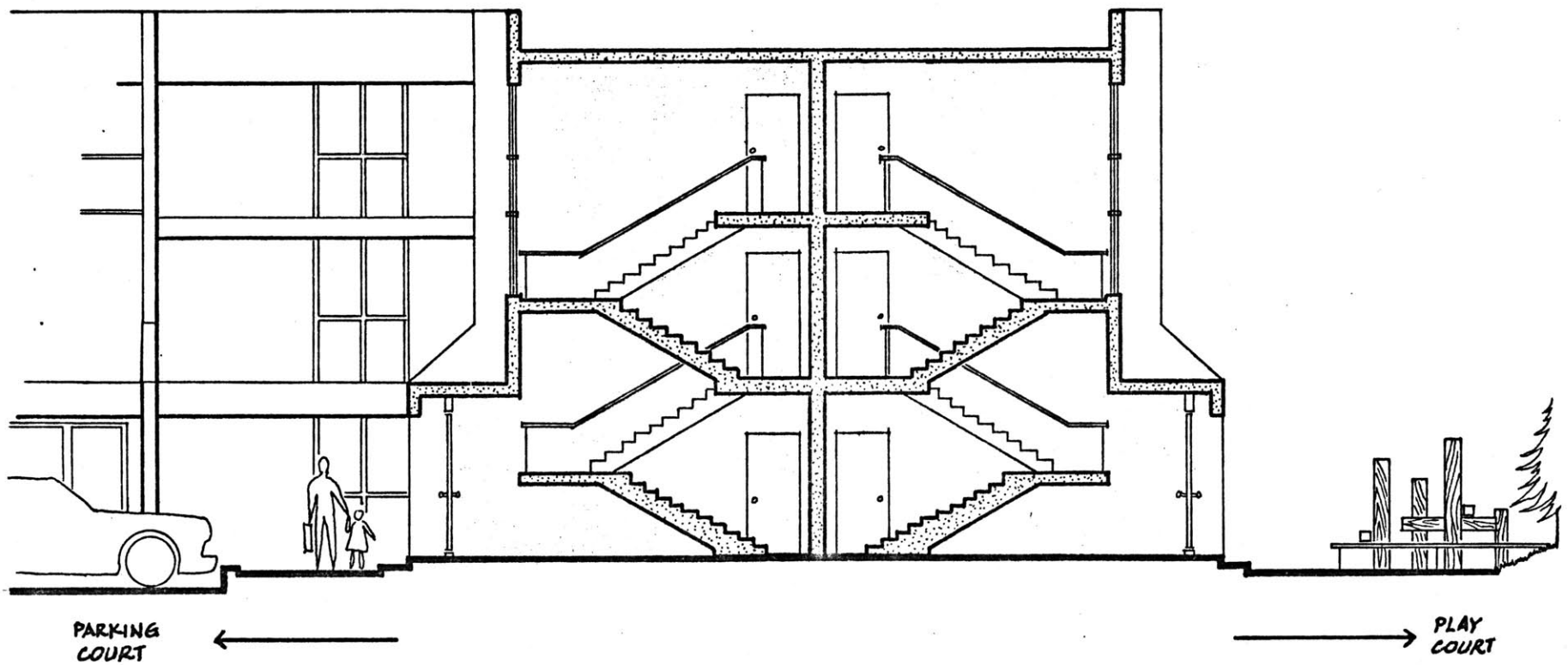


FIGURE 17 Pine Grove Mothers Sunning Their Infants Together Outside Their Entrances

At Roxse Homes, while there are courts also, each apartment has two doors that lead to courts on different sides of the building (FIGURE 18). Few residents felt part of either court. Some residents recognize the other five families who share their front and back entrances, but as TABLE 10 shows, only one respondent among thirteen interviewed knew these families by name. Yet Roxse Homes tenants did not feel estranged. An elderly black lady explained what it was like to live in such a situation. She was speaking of those neighbors she only knew by face. "Oh yes! They're friendly, especially if you get to know the people. We really watch out

FIGURE 18

ROXSE HOMES ENTRANCES FROM DIFFERENT SIDES OF THE BUILDING



for each other...when a little girl got hurt we all got out together... when the Chinese man next door left his key on the doorknob, I made sure his daughter knew the key was out." In contrast, a middle aged black lady in Warren Garden plaintively said, "We don't loan stuff...and they don't watch out for your place. Last year someone tried to break in and no one told me." At Roxse Homes, neighbors who didn't really know each other felt they nevertheless could count on help in times of need.\* That willingness to extend help and to receive it is probably closer to the spirit of community than having casual acquaintances on whom one could not depend. At the two Roxbury sites the primary concern was building security. Neighbor's friendliness were evaluated according to their perceived willingness to protect others homes.

At Pine Grove, there is no concern of such immediate importance. While there are ample opportunities for social events, some tenants feel a need for relationships different from the "shallow friendliness" mentioned by one respondent.

This non-uniform standard of friendliness cautions against any strong statement equating number of acquaintances with the development of an sense of community.

Although we do not yet fully understand the basis of the sense of community, we recognize that it can influence other categories of concerns.

"Community" influences the perceived security of a site (6). During one of our interviews, a man told us how his car had recently been stolen from one of the site parking lots. That theft, however, did not seem to

\* 70% of those interviewed at Roxse Homes said it was true that neighbors watch out for each other.

affect this man's confidence in Roxse Homes' security. This is because the theft occurred in the end parking lot --(FIGURE 19) a lot that is not surrounded by dwellings as are all the other Roxse Homes parking courts. Two points are relevant. First, the theft victim probably excluded that parking lot as a site space simply because it was so different. Second, that man firmly believes that had his car been in one of the defined parking courts, the theft could not have occurred because his neighbors would have intervened. This illustration shows the combined positive effect on perceived security of a sense of community and an arrangement of buildings that enhances "territory". Thus both "community" and "territory" are said to have partial influence on "security".

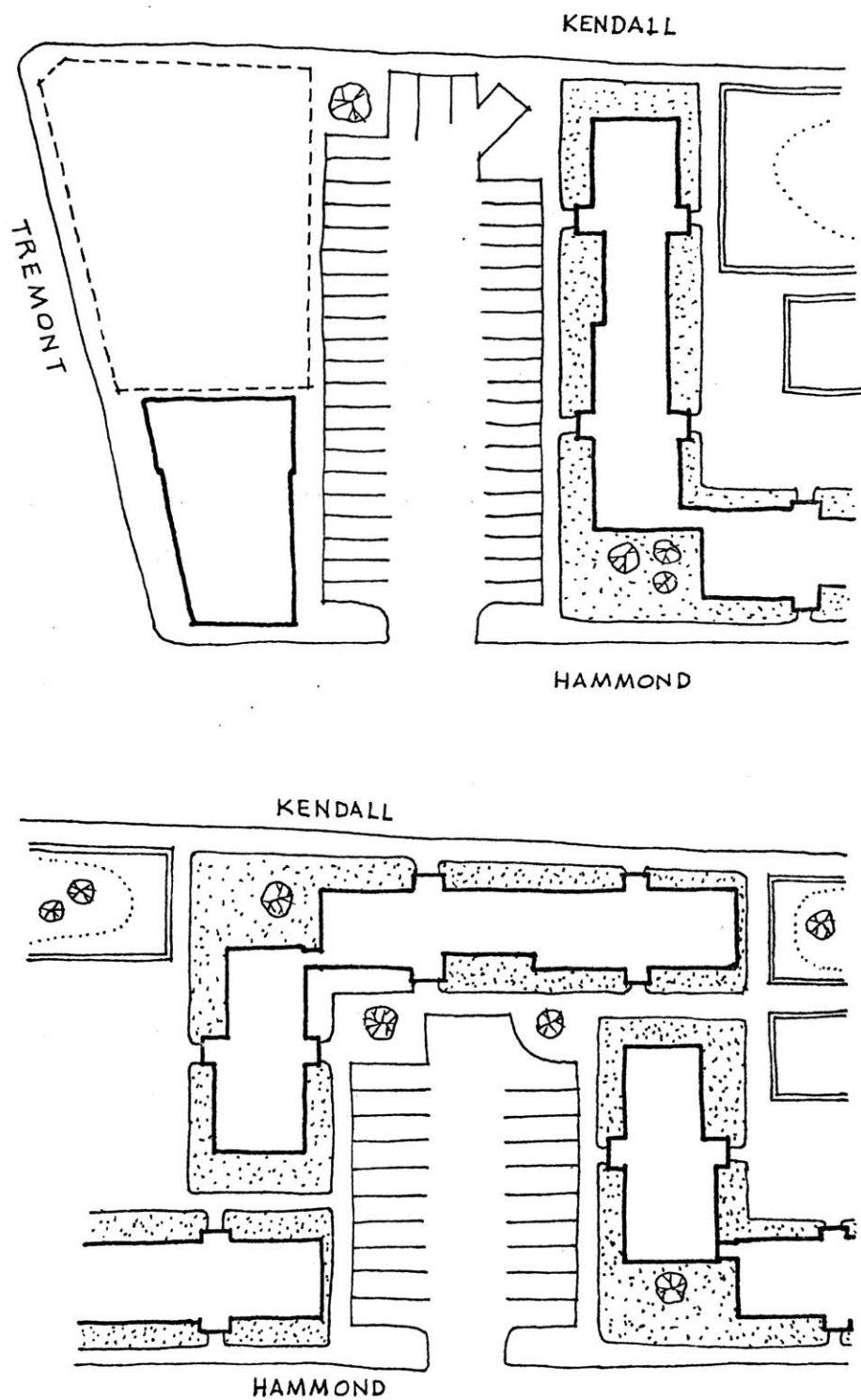
"Community" and "territory" also work together to influence "Maintenance" (7). IMAI (1973) suggests from his study that:

Collective resident clean up takes place more readily in communal areas if that area is physically defined to belong to its constituent dwellings and if the constituents communicate with each other to establish common attitudes and goals.<sup>6</sup>

What Imai refers to as communication of common attitude and goals we call "community".

Lest it appear that design concerns have no place in "community", we will relate a case from Pine Grove where poor design created some misunderstandings among the neighbors. At Pine Grove, it has been a basic policy to house a few elderly couples in clusters otherwise made up of young families. This would have worked well for some people such as the elderly lady who said "I don't enjoy some of the things the children do, but I enjoy the children...we can learn to live together." In other cases, some conflicts have arisen. For example, an elderly couple complained of

FIGURE 19



COMPARISON BETWEEN THE END PARKING LOT AND A PARKING COURT

children's noise. Their younger neighbors did not agree with their complaint. A few young women interviewed at that cluster blamed the elderly couple for being "cranky" and suggested that the elderly couple should be placed elsewhere. Closer investigation suggests that the conflict could have been avoided. The primary source of noise was a slope not more than eight feet behind the elderly couple's unit, (FIGURE 20). Slopes and



FIGURE 20 The Slope behind the House

mounds are preferred play areas for children<sup>7</sup> who run up and down, dig-up, and climb on them. In addition a well worn path at the base of the slope indicates that much traffic passes here. The play area and the traffic being so close to the elderly couple's unit produced the noise "problem". A design that separates such potentially noisy areas from the dwelling units could have prevented some of the ill-feelings in that cluster. The younger tenant's conclusion that the elderly should be moved rather than the design changed suggests that some people are not sufficiently aware of the effect of design decisions on their lives.



## IMAGE

In comparing the two subcategories under "image", (TABLE 9), the use of the question referring to "preference of the present environment over the previous" was not found to provide useful data differentiating positive responses across the three levels of overall satisfaction. The vagueness of this subcategory and the inconclusive results from its use argue for its exclusion from the categories we consider important. In contrast, the other image subcategory, attractiveness, had one of the highest levels of correspondence with overall satisfaction with open spaces.

The attractiveness of a neighborhood is a very important criteria for resident satisfaction. When it's there, it may be overlooked and underrated; when it's not, residents certainly notice its absence. A recent study<sup>8</sup> of five high-density public housing projects in England revealed through regression analysis that it was resident's reaction to the appearance of the projects that had the greatest effect on their overall satisfaction. The project in which residents were most satisfied was also the one rated most attractive.<sup>9</sup>

Since one subcategory has already been eliminated from "image", and the only remaining subcategory, "attractiveness", is so important, we will change the name of the image category to "attractiveness". A definition for the new attractiveness category follows:

"Attractiveness" refers to the correspondence between an individual's impression of his environment and his expectations. In site open spaces, we consider two subcategories: "Landscaping" and "Views".

## PRIVACY

"Visual Privacy" was shown in TABLE 9 as one of the subcategories important to overall satisfaction. The high percentage (70%) of respondents who had no visual privacy problems probably reflects a certain bias in our original choice of subjects. Two types of people have been identified as groups that have less of a need for visual privacy.

- 1) Women with children aged 0 - 4<sup>10</sup>
- 2) People who stay home most of the day<sup>11</sup>

Because of the times of the day during which interviews were conducted, a large proportion (91%) of the interviews involved non-working and retired men and women. Also just less than half (42%) of our respondents had young children in their families. Thus, it is likely that such a group will require less visual privacy. Eleven out of the thirteen (85%) of the respondents who had visual privacy problems lived in Warren Gardens. Our earlier discussion of "security" stressed the effect of Warren Garden's poor security on the need for visual privacy. While our data suggests that visual privacy is not important except in areas of poor security, the bias of our subjects remind us to be cautious.

While aural privacy did not seem to be important to overall satisfaction, our study suggests that the lack of aural privacy is a problem. Eleven out of eighteen (61%) respondents who had aural privacy problems lived in first floor units. At Pine Grove and Roxse Homes, two sites with at least 30 children per acre, 80% and 75% respectively of the ground floor respondents complained of noise. At Warren Gardens, where child density is only 5, only 29% of the townhouse respondents complained of

noise. So noise problems seem to be worse for ground floor residents in developments with high child density. Other studies<sup>12</sup> have found the aural privacy is one of the most important predictions of satisfaction. But this study has not produced results to support that position.

While "territorial privacy" was shown to be unimportant to overall satisfaction, there is reason to believe that it is actually a very important category. Part of the cause of the poor results on "territorial privacy" stem from the question asked in the interview -- "Do you think this is a good size for a housing group?" That question seems to have missed the main point of territory which is whether or not an individual could identify a space as being "his". Evaluating the potential of a space to be claimed by proximate dwellers remains a problem for future work.

We will, however, draw from other studies to show the influence of "territorial privacy" on other categories. Referring to Imai's work, we suggested that "Territorial Privacy" along with "community" influences "maintenance" (8). "Territorial Privacy" together with "community" influences "security" (9). Our Roxse Homes car theft victim story is an illustration of that relationship. In fact many of Newman's recommendations<sup>13</sup> for crime prevention through design involve measures to enhance territoriality. For example, he suggests differentiating grounds, sharing entranceways and courts, and arranging windows for better surveillance. These measures help define the extent of permissible access to a space.

A sense of territory affects "community" by developing common interests in the use and the defense of a space (10). Cooper's study of St. Francis square in San Francisco told about the great sense of possessiveness felt by many children toward "their" square, so that they were willing

to drive off other children who did not live there.<sup>14</sup> A number of studies<sup>15</sup> also suggest that neighbor contacts tend to be increased in designs that enhance territory. But whether these neighbor contacts develop into a sense of community will depend on whether tenants can see their common interests further served by a deeper mutual commitment.

Territory affects the use of outside activity spaces (11). At Pine Grove, common courts are shared by about thirty families. Because these courts are clearly identifiable with the cluster of dwellings around it, and because residents get to know their neighbors, many mothers allow their children, even toddlers, to play there without constant supervision. For these mothers, the common court has met the need for play space in a situation where there are no private yards.\*

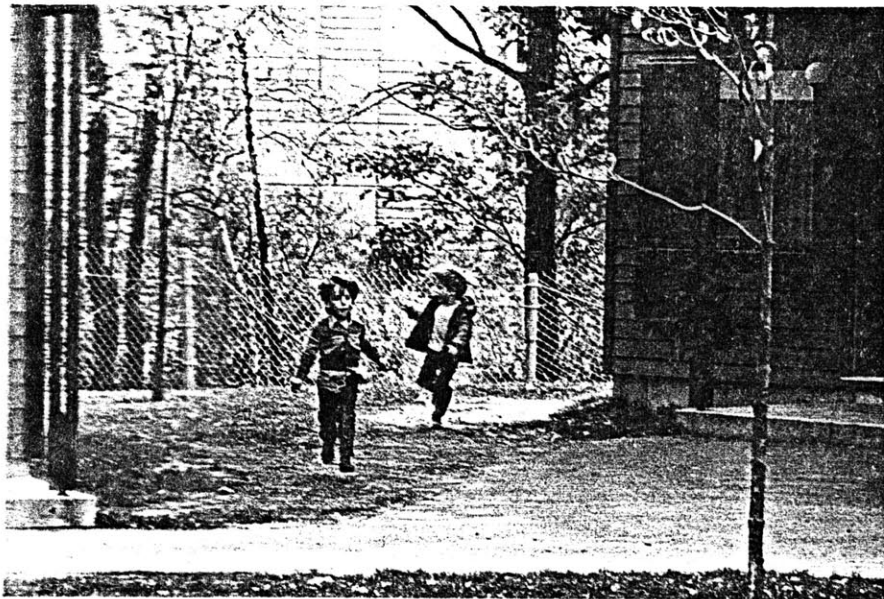


FIGURE 21 Play Activity in a Pine Grove Courtyard

\* Five out of the eleven (45%) of those Pine Grove respondents who considered private yards important were willing to accept the common space as a substitute. Many such people started referring to the common space as a "yard".

Our informal observation of activities<sup>\*</sup> supports the idea that territory in the sense of a better defined space enhances the space's use for activities. At Pine Grove, the most well defined -- i.e. with buildings on all four sides, fenced, and situated on a hill -- court was also observed to have the highest total number of activities over the course of five observation periods.

While our earlier analysis did not find "territorial privacy" important to overall satisfaction, discussion in this section identified influences on no less than four other categories -- maintenance, security, community, and access. Since these influences do not come from the other two privacy subcategories, it is possible to separate "territory" from the privacy category and consider it a separate design category. This increases the total number of design categories to four. "Territory's" definition follows:

"Territory" is delimited space that an individual or a small group can claim exclusive use of and can identify with.

## ACCESS

### Access for the Children

The results of our interviews, observation of activities and of signs confirms some of the expected children's patterns of space usage. It was expected, for example, that toddlers would play closest to home in an area defined by built elements such as entrances and courtyards. At Pine Grove,

<sup>\*</sup> Please see the note under "Access for the Children".

courtyards of about 30 dwellings are defined by three story buildings. More activities occur within these courtyards than outside.\* Of those children observed to be playing in the courtyards without adult accompaniment, more than half (57%) of the children were toddlers. The activity observations and the signs of extreme wear on the grass near the doorway, further suggests that much of the play occurs right in the entranceway, (FIGURE 22).

Informal observation of activities at both Pine Grove and Warren Gardens support findings from other studies that young children are major users of site open spaces, (FIGURE 23). Roxse Homes, however, was an exception because it had little outdoor play activity.\*\* Given Roxse Homes' high child density, a low activity level is surprising. Part of the explanation is from the proximity of major business areas and streets that have attracted some of the play activity. Another factor mentioned several times in interviews is the presence of "bad", "fresh", or "rough" children in the outside play areas. That fact encourages some parents to keep their children indoors. Four of the twelve families with children interviewed at Roxse Homes, felt the problem bothersome enough to complain about it to their interviewer.

As expected, older children and teenagers were the groups least frequently observed at the sites. At Pine Grove, some tenants mentioned that

\* Informal observations were conducted at five observation periods between 11 am and 6 pm on weekdays. A prescribed route through 15 observation points was followed each time. Two thirds of the observation points were within cluster courtyards. The remaining third were in other spaces outside the clusters. 86% of all children activities observed occurred within the studied courtyards.

\*\* A low level of activity outdoors at Roxse Homes is also noted in "A Survey of Roxse Homes".

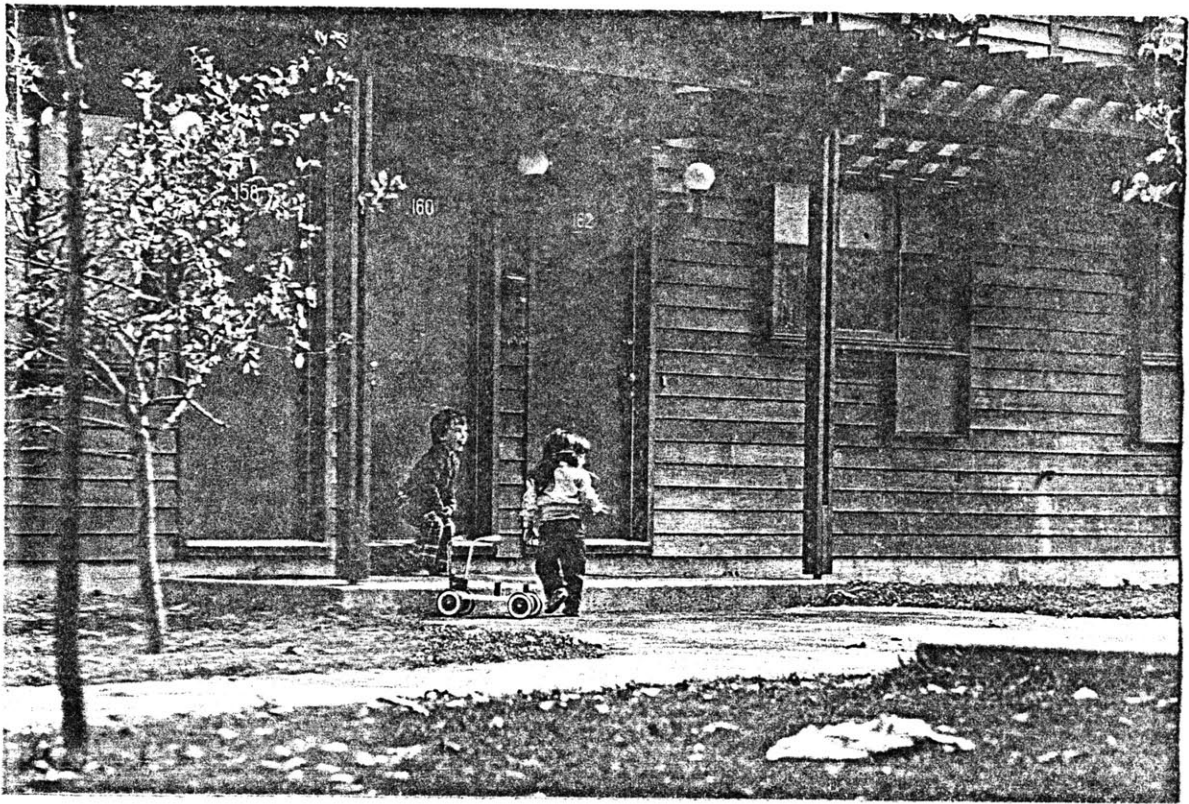


FIGURE 22 Toddler's Play Near Dwelling Entranceways



FIGURE 23 Children Playing at Warren Gardens

the teenagers congregate in an area furnished with picnic tables near one of the two site entrances. While the author never saw older children or teenagers there, the litter -- beer bottles, cigarette cartons, and candy wrappers were probably left by that age group. At both Warren Gardens and Roxse Homes, tenants made specific references of neighborhood facilities away from the site where their older or teenage children go for recreation because no such facilities are available on the site. The use of these off site facilities help explain why few older children and teenagers were observed on site.

The results on "access for children" from the interviews, (TABLE 8), show weak correspondence between satisfaction with that subcategory and overall satisfaction. If we consider the results from Pine Grove and Roxse Homes, two sites with dissimilar settings and open space arrangements, we notice that in both cases only about half of those respondents who felt they had adequate play spaces for their children were also highly satisfied overall. Realizing that few children played at the Roxse open spaces, we are surprised to find that two thirds of respondent families with children nevertheless thought play spaces adequate. These two preceding results suggest that the question -- " Are there places on the site for your children to play?" -- inadequate to elicit responses about the appropriateness and desirability of the places where the children do presently play. Respondents probably understood this question to mean "can or do your children play outside?". A resident's child playing outside at whatever spaces are available is not a condition which will likely increase the resident's overall satisfaction. Further work is required to find out the best means to elicit tenant evaluation on the appropriateness of available spaces for child play.



### Access for the Adults and the Elderly

Adults were, in general, seen in numbers far below their proportion of the site populations. When outside, they were often involved in child care activities or in household chores (e.g. shopping trips, laundry, etc.). Since only a few of those adults interviewed mentioned a desire for outdoor recreational spaces, we can say most adults did not consider the provision of such places a factor in their assessment of overall satisfaction. As a consequence, we will change this subcategory to "access for the elderly" having eliminated considerations of the adult's preferences.

It was expected that the elderly would be frequent users of outdoor spaces. This study observed and interviewed too few elderly people to support that expectation. However, five out of the seven elderly people interviewed at all three sites felt that their site did not provide them with adequate open spaces, indicating that inadequate open spaces for this age group may be a serious problem.

### Access to Spaces Outside of the Site

This subcategory was included to see whether tenant's open space needs could be satisfied by non-site spaces. It was mistakenly assumed that most tenants would have cars, therefore adequacy of parking was used as an index of accessibility to spaces away from the site. In fact, many of the tenants interviewed at the subsidized housing sites used in this study could not afford a car. Some elderly people who could afford cars either did not know how to drive or could no longer drive. Results from the interview showed that high percentages of those with high or average overall satisfaction also felt that they had no problem with access to parking areas. While parking might well be an important consideration, adequacy

of parking cannot be assumed to relate to access to spaces outside of the site. A better measure is needed.

Based on our preceding emphasis on activities, it is appropriate to change the name of the "access" category to "activity spaces" in order to obtain a more direct description of that category. The definition of "activity spaces" category follows:

"Activity spaces" refers to safe, accessible, usable, and available outdoor spaces. Three subcategories are "site spaces for the children", "site spaces for the elderly", and "spaces outside of the site".

We recall from previous discussions of other categories that the "activity space" (or "access") category is influenced by "Territory", "Maintenance", and "Security". This makes it appear that "activity spaces" is totally passive. While this study does not provide proof, it is possible that in high crime areas, activity improves the security of specific places because the use or, more precisely, the presence of users might be expected to discourage the commission of crimes that normally thrive unseen.

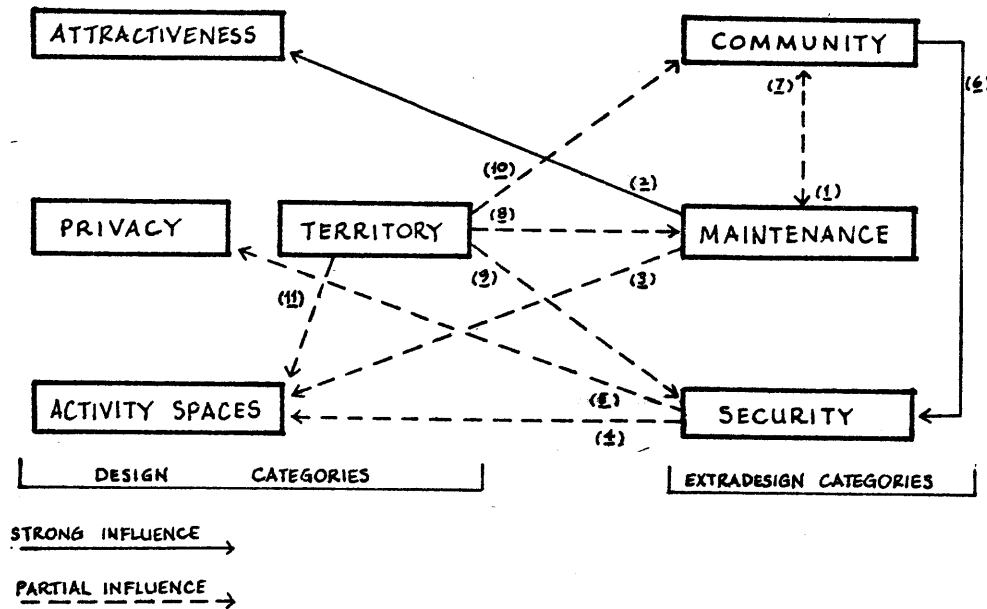
## MODEL OF INTERRELATIONSHIPS

### THE DESCRIPTION OF A DIAGRAM OF RELATIONSHIPS

FIGURE 24 summarizes eleven relationships described in the preceding review and redefinition of the categories. The diagram illustrates how the seven categories of concerns important to overall satisfaction affect each other. Most links in this diagram are indicated by dashed lines signifying that one category has a partial influence on the other. "Partial influence" means that the specific category has an influence but it

FIGURE 24

DIAGRAM SHOWING INTERRELATIONSHIPS BETWEEN CATEGORIES  
RELEVANT TO OVERALL SATISFACTION



- |  |  |
|--|--|
| (1) Good maintenance leads to a sense of responsibility for common areas. Poor maintenance will hurt the sense of community (p.71) | (7) Resident organized clean-up efforts occur more easily in places with a sense of community (p.80)                                 |
| (2) Maintenance strongly influences perceptions of attractiveness (p.72)   | (8) Resident organized clean up efforts occur more naturally in communal spaces identifiable as a specific group's territory ((p.85) |
| (3) Maintenance affects which areas will likely be used for activities (p.72)  | (9) Territory influences security (p.85)   |
| (4) Security affects use of spaces (p.73)  | (10) Territory affects community by developing some common interests and acquaintances ((p.85)                                       |
| (5) Security affects the need for visual privacy (p.74)  | (11) Territory affects access to activity spaces (p.86)  |
| (6) Community Involvement leads to better security (p.79)  |  |

must work along with other factors in order to create a positive result for the influenced condition. For example, IMAI (1973) found that both "territory" and "community" are necessary before resident group clean-ups are likely to occur. We would say that both "territory" and "community" exert partial influence on "maintenance". On the other hand, "strong influence", indicated by a solid line on the diagram, means that the influencing category has a dominant effect on the influenced category. For example, we found at Roxse Homes that tenants had learned that their involvement is the key to better security. Their willingness to "watch out for each other" was the basis on their feeling safe in a high crime area. Their willingness to intervene on a neighbor's behalf made Roxse in fact a more secure place than other places in the neighborhood.

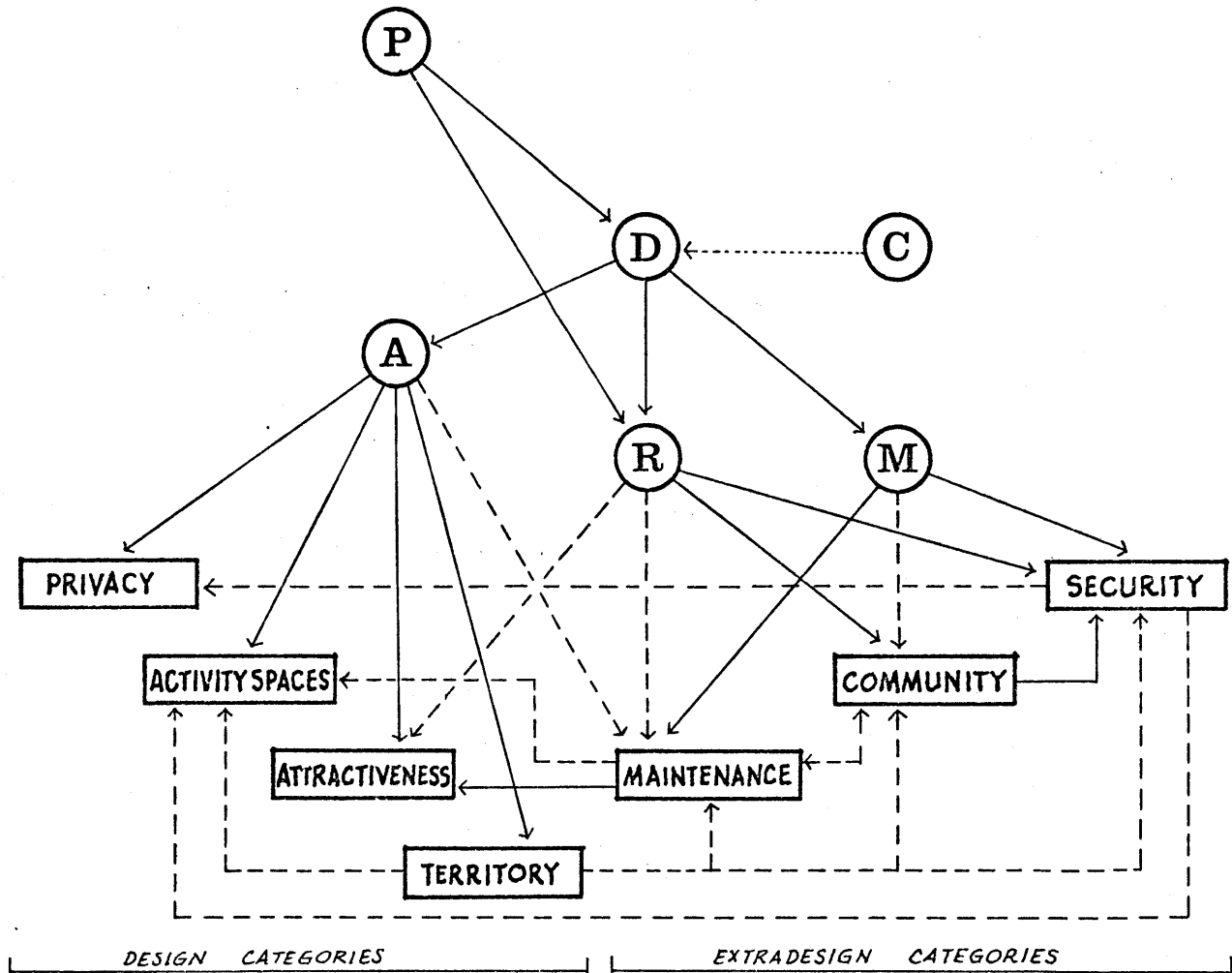
Turning to FIGURE 24, we see that the different categories are able to exert a number of different influences on other categories. TABLE 8 shows that "maintenance" and "territory" are the two most influential categories. Both "community" and "security" influence two other categories. None of the design categories, other than "territory" have any influence on other categories. It is significant that "territory", a design category, can exert influence on all three extradesign categories. This suggests that "territory" is the category where design can indirectly exert the most influence on overall satisfaction.

#### THE EXPANSION OF THE DIAGRAM INTO A MODEL

We will combine the relationships between the two categories, (FIGURE 24), with the influence of the various actors in a typical development process, (FIGURE 12) into a composite picture (which we call a model) summarizing interrelationships among actors and categories, (FIGURE 25).

FIGURE 25

MODEL SUMMARIZING INTERRELATIONSHIPS AMONG  
ACTORS AND CATEGORIES



STRONG INFLUENCE →

- - - - - PARTIAL INFLUENCE →

..... POTENTIAL INFLUENCE →

(P)

POLICY MAKERS

(A)

ARCHITECT

(D)

DEVELOPER

(R)

RESIDENTS

(C)

COMMUNITY  
INTEREST GROUP

(M)

MANAGEMENT

TABLE 11  
THE NUMBER OF OTHER CATEGORIES INFLUENCED BY  
EACH OF THE SEVEN CATEGORIES

CATEGORY	INFLUENCES ON EXTRADESIGN CAT.	INFLUENCES ON DESIGN CATEGORIES	TOTAL NUMBER OF INFLUENCED CATEGORIES
TERRITORY	3	1	4
MAINTENANCE	1	2	3
COMMUNITY	2	0	2
SECURITY	0	2	2
ACTIVITY SPACES	0	0	0
ATTRACTIVENESS	0	0	0
PRIVACY	0	0	0

While we have been using what has been called a "typical housing development process", we do not suggest this as an exemplar. One blatant weakness is its exclusion of the users, often low income people in the case of subsidized housing. Referring to FIGURE 25, we notice that the "residents" are a group that is able to exert influence on all three extra-design categories. And these same categories were the ones shown to have the most influence on overall satisfaction with open spaces. Therefore it is tragic that this actor, one so influential to the success of a development, should not have influence in the shaping of their housing environment simply because they arrive at the scene so late.

The exclusion of influence from residents can be remedied. During the course of this study, the author came across models of other development processes that recognized the influence of residents.

Where potential residents are identified and organized, they can exert influence upon the developer on the choice of both an architect and a management company. The Charlesview Housing Development in Boston is an example of resident input on the choice of an architect and the approval of his designs.<sup>16</sup> Roxse Homes is another example. Here the future residents insisted upon and succeeded in employing a manager who had demonstrated interest and competence for such a job.<sup>17</sup> For developments that intend to serve local housing needs, potential tenants will likely come from the local community. This study acknowledges the need for a community organizer to coalesce the potential tenants into a group, but will not go into any detail about such an agent. We assume that such a community interest group can be formed to represent the interest of potential tenants and thus we include it as an actor in our revised development process. This community interest group's influence is drawn at the top right of the diagram, (FIGURE 25). The dotted line indicated that such an influence is a potential not necessarily realized in every development.

#### THE USE OF THE MODEL

The model of interrelationships, FIGURE 25, is to be an aid in designing open spaces in housing. To illustrate, we look at a new development, where all the categories of concerns should be dealt with. The model reminds a designer or an architect of the systematic nature of the categories, so that he can know how to design to enhance or to weaken specific relationships. For existing developments, the model provides for those responsible for the development a structure with which to deal with the problems that have surfaced. An example will better elucidate the use of the model.

Let us suppose that a certain development with communal open spaces is plagued by poor upkeep. This is a maintenance problem. FIGURE 25 shows that three actors can influence the maintenance category. Several separate courses of action are available. Each of the three actors can take action without the support of other actors. The architect can replace items that are hard to maintain, but this is only a partial influence particularly weak because it cannot remedy the upkeep problem. It only make upkeep easier if someone is to do it. The residents can be asked to "take more responsibility". If they should agree to do some of the upkeep, it is nevertheless likely that the upkeep will not cover common areas. The management can, of course, hire more personnel and do a good job, but that will cost more money than the development can afford. Accepting a common problem of limited funds, those responsible would do best to suggest an approach compatible to their resources. If a large, one-time allotment of money were available, it would be appropriate to hire an architect to suggest immediate changes. FIGURE 25 shows that the architect can choose the partial direct influence on "maintenance", or choose the strong indirect influence through the territory category. The second approach is more effective because "territory" influences both "maintenance" and "community"; in addition, "community" also influences "maintenance". Working on "territory" sets off a chain reaction that leads to two partial influences on "maintenance" compared to the single influence of the direct approach. On the other hand, if additional funds were available only on a piecemeal basis, FIGURE 25 suggests that the bulk of each payment be allocated to the direct strong influence of "maintenance". Part of each payment, however, should go to community development efforts



in order to encourage resident upkeep efforts to compliment management's program.

Various approaches are available either individually or in different combinations depending on what kinds of resources are at hand. The model only suggests alternative approaches based on discovered linkages between the categories, other factors -- economic, social, or political -- may in individual cases dictate the most effective final choice of a strategy. Similar societal factors also put constraints on design choices. APPENDIX E presents design guidelines relevant to various locational, density, and management conditions.

## CHAPTER SIX THE SUMMARY AND THE CONCLUSIONS

This thesis has tried to develop a way of thinking about the design of open space in housing. We started by postulating six categories of concerns thought to be essential to overall satisfaction with open spaces. Data from fieldwork was then used to demonstrate the effect of satisfactions with individual categories on overall satisfaction. Two results emerged clearly from the analysis of the data. First, satisfactions with extradesign categories had a stronger influence on overall satisfaction than the satisfactions with design categories. Second, our initial formulation of categories was basically sound, even though we later revised some of the categories to make them more specific. The new set of seven revised categories were then presented in a diagram that showed relationships between the categories as identified in this and other studies.

Open space housing has been a good context to study the role of design in relation to the many other actors who have influence on a final housing development. By studying a hypothetical model of a subsidized housing development process, we were able to identify the three actors who directly influence all the concerns covered by our categories. These actors are the architect, the residents, and the management. The archi-

tect primarily influences the design categories while the residents and the management primarily influence the extradesign categories. Our data analysis showed that satisfactions with design categories have little influence on overall satisfactions. Such a finding leads to temptation to conclude that design is unimportant. That conclusion is, however, incorrect. Let us consider the role played by design. Design as a factor in the development process is unique in that it exerts its strongest influence (i.e. shaping the environment) often before the other two actors appear on the scene. When the residents and the management arrive design's task is already complete. While design's continuing influence may thus be limited, that influence is nevertheless important. To illustrate, we look to Warren Gardens, the study site that had the highest percentage (38%) of respondents generally dissatisfied with site open spaces. It is significant that four out of our thirteen respondents remembered and commented that Warren Gardens was once an attractive and desirable place to live. While things had changed, Warren Gardens could nevertheless be restored if efforts to do so were undertaken. One tenant was even able to imagine the development apart from its present situation. She said: "This is what I've always wanted. . . (and I) would like such a place in the suburbs." Thus, the original design continued to make a difference long after the architect was gone. The original design demonstrated it was reasonable to expect Warren Gardens to look much better than its present neglected condition. This thesis suggests that the establishment of high expectations in the dwelling environment is a vital contribution attributable to design.

There is another observation from Warren Gardens relevant to the role of design. In regard to maintenance, Warren Gardens tenants rated their development on the average somewhere between "terrible" and "bad", by far

the lowest rating of the three study sites. And yet half of the respondents said that they were willing to and had helped in clean-up efforts. This proportion is similar to the proportion of those who were willing to help clean up in other sites. What is noteworthy is that, the other half of the respondents did not say that they were unwilling to help clean-up as did their counterparts at the other two sites. The Warren Garden respondents who did not answer "yes" gave qualified affirmative answers. "Yes, but only as far as my space. . . or, yes, only in the area near my house. . . or yes, I have to do it but prefer not to." The implication of these comments is clear. The tenants at Warren Gardens felt that certain areas were their responsibility. Whether management did its job or not did not change that fact. This responsible attitude toward a space not actually owned but nevertheless perceived to be owned, suggests an original design that had successfully delineated territories for the residents.

Our diagram of relationships between categories, (FIGURE 24), shows that the territory category is the only category that can influence all three extradesign categories. The answers to the question of resident clean up speaks of "territory's" effect on "maintenance". The fairly high percentage (79%) of respondents who considered Warren Gardens a "friendly place to live" speaks of "territory's" effect on "community". Although "security" is still unexplainably poor, the beneficial effects of a design emphasizing "territory" are already obvious. Here, the design -- the product of the architect, an actor no longer influential in the daily workings of the development -- still continues to affect the patterns of behavior of the residents.

Perhaps it is true that design categories are weakly linked to overall satisfaction as we have measured it. Yet we have seen that design succeeds in setting high standards, in encouraging responsible behavior, and in de-

veloping a sense of community. These positive influences suggest that design's importance transcends that which we have tried to measure with our question of perceived satisfaction.

This study relates the design categories to Maslow's highest need level -- self-actualization or the need to seek maximal realization of one's potentialities. Results from Pine Grove seem to support that classification of design categories. The developmental nature of Maslow's hierarchy suggests that as lower needs are met higher needs become more salient. Pine Grove, where 75% of our respondents said they were highly satisfied overall, apparently has not met all its residents' needs. One sign is its high turnover rate caused by tenants moving on to single family homes. While many tenants are "highly satisfied now", they cannot see Pine Grove meeting their longer range needs. There are those who think that Pine Grove buildings look like barracks.<sup>18</sup> So it is no wonder that these "barracks" offer no real alternative to the American dream house -- the single family detached house. We suggest that the high overall satisfaction which is related to the fulfillment of lower needs opened the way to the appreciation of a higher need as indicated by the critical evaluation of design concerns. On the other hand, at neither Warren Gardens nor Roxse Homes where respondents on the average were less satisfied overall, did any respondent comment on the appearance of their development.

We have thus seen that design has a role to play beyond meeting the basic needs. Design can help support the fuller realization of human potential. And that is a significant role.

## CLOSING THOUGHTS

While the author did not expect major new conclusions from this exploratory study, he had nevertheless hoped to answer some questions that had arisen in the course of his architectural education. So it was gratifying to realize that many of those questions had been answered. But in that process new questions arose.

When the study first began, the author assumed that he could elicit residents' evaluation of their environment by simply asking and probing. Yet from the beginning, there were difficulties in the formulation of questions about design concerns. Even probes were only of limited use because respondents seem to lack viable alternatives to their present living conditions. Under such circumstances, it was difficult to distinguish between actual satisfaction and uncritical acceptance of whatever exists. Part of that problem resulted from our attempts to gauge design in relation to high level needs such as self-actualization, self-esteem, or belongingness. While these needs seem central to an individual's life, there was no common language between the author and the subjects that allowed respondents to realize design's contribution to the satisfaction of those needs. So appropriate measures and techniques of measurement of design's contribution are questions that remain unanswered.

Another question that arose during the study involves the issue of comparability. When we first discussed the choice of study subjects, we said that information about the residents of developments is not readily available. Even if information were available, what social or individual characteristics should we consider in studying the effects of design? If the study had followed established statistical sampling methods, we could

have better justified our results in statistical terms. But the question is still open in my mind as to whether standard demographic indices provide adequately precise controls for a study of the behavioral consequences of design.

Finally, the problem of aggregating responses is not resolved. The weighting scheme used in the graph in chapter four, was based on the assumption that all the categories are of equal importance to levels of overall satisfaction. Subsequent analysis showed that the categories are not of equal importance. Through the course of this study, we tried several other weighting schemes recognizing the unequal importance of the categories. We even tried one weighting scheme that changed according to the type or the stage in life cycle of the respondent's family. While these attempts took much effort, they were unproductive, first, because of the limitations of our study methods and, second, because of the lack of a clear method by which to compare the merits of different weighting schemes. However the author feels that there is promise in further research into such aggregation techniques.

## APPENDIX A

### THE VREEWIJK STUDY

#### BACKGROUND INFORMATION

Vreewijk, a development of subsidized rental housing, is located within the Dutch city of Rotterdam. It was built sixty years ago but is still serving well its original purpose of providing low rent housing. Today more than 16,000 people live within the 158 acre site. Almost ninety percent of its 4100 dwelling units are attached houses with private yards. The site plan is based on a simple alternating pattern of house-path-house-road. Yet within this simple pattern is found a variety of private and communal open spaces.

#### THE STUDY

Vreewijk's open spaces were used for preliminary methodological work for this thesis. During an entire week in August 1975, the author conducted behavior mapping studies at nine locations within the site. The author used a bicycle to cover a planned route which linked nine observational locations, (FIGURE 28). In each of the first six locations, which are either semiprivate or semipublic spaces, he did ten-minute observations. In each of the remaining three locations which are public spaces, he did half hour observations. The route was traversed twice a day thereby obtaining observations at each location for both mornings and afternoons. All observations were made in clear summer weather.

A notation system was developed and used to record type of activities, approximate ages of actors, and group sizes in each of the nine locations. The results were analyzed later to find relationships between activities and characteristics of physical spaces. TABLE 12 describes some characteristics of the nine spaces. Captions below the drawings summarize basic characteristics of the space.

TABLES 13 to 19 summarize the results of the observations.





FIGURE 26 General View of Houses along a Street  
in Vreewijk

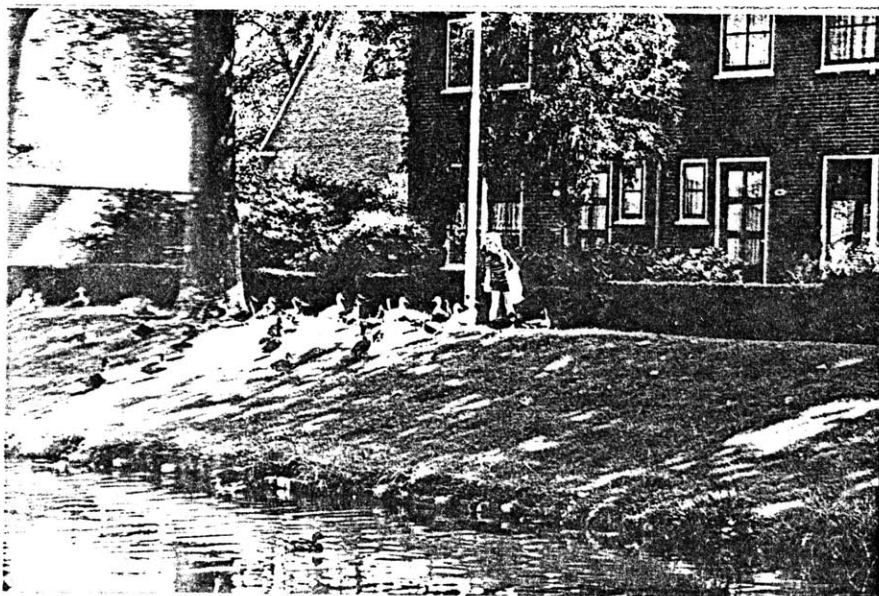


FIGURE 27 A Little Boy Feeding Ducks by His  
Canal-side Home

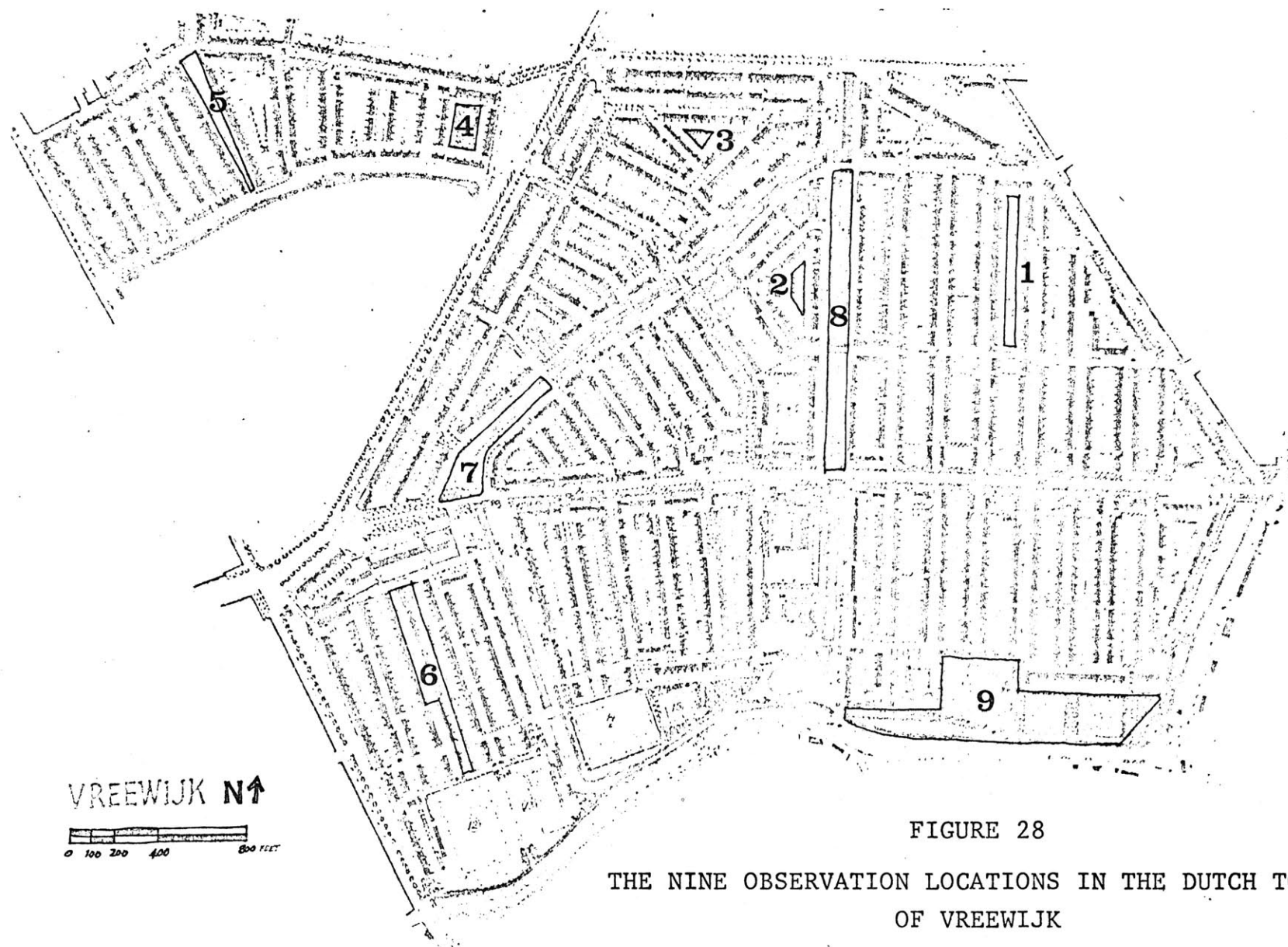


FIGURE 28

THE NINE OBSERVATION LOCATIONS IN THE DUTCH TOWN  
OF VREEWIJK

TABLE 12  
CHARACTERISTICS OF THE NINE OBSERVATIONAL LOCATIONS

Location	Characteristics
1	Semi-Private, 27,000 sq. ft., 101 Dwelling units Shared space cordoned off by hedges
2	Semi-Private, 10,5000 sq. ft., 64 Dwelling units Shared space defined by hedges but accessible through breaks in the planting
3	Semi-Private, 1,2000 sq. ft., 42 Dwelling units No hedges surround this space, but hedges separate the adjoining backyards from it.
4	Semi-Private, 21,000 sq. ft., 50 Dwelling units Hedges had been removed from around this space as part of a modernization program
5	Semi-Public, 17,000 sq. ft., 65 Dwelling units Partially paved, linear shaped space, with vehicular road on two sides
6	Semi-Public, 63,500 sq. ft., 82 Dwelling units Mostly grassed with a pond in it, also a vehicular road through it
7	Public, 47,000sq. ft. Green area near a bend in the canal, with a vehicular road behind it
8	Public, 63,000 sq. ft. Grassed sloped banks of the main canal through Vreewijk
9	Public, 268,000 A large, flat recreational area surrounded by tall trees.

TABLE 13  
COMPARISON OF THE INTENSITY AND THE RANGE OF  
ACTIVITIES AT THE DIFFERENT LOCATIONS

Location		Activity/Day D.U.	Activity 100 SF	No Activity Categories
Semi Private	1	.000	-	0
	2	.050	-	3
	3	.035	-	2
	4	.143	-	5
Semi Public	5	.054	-	2
	6	.066	-	5
Public	7	-	.016	4
	8	-	.231	8
	9	-	.190	7

TABLE 14  
AGE DISTRIBUTION OF OBSERVED SUBJECTS

Age	Observations	Management Estimates
0-4	16 (5%)	4%
5-9	103 (32%)	} 13%
10-12	22 (7%)	
13-15	41 (13%)	
16-18	14 (4%)	4%
19-59	69 (22%)	49%
60+	53 (17%)	30%
	318 (100%)	100%

TABLE 15  
DISTRIBUTION OF SUBJECTS BY AGE AND  
PRIVACY LEVEL OF LOCATION

Age	Semi Private (Loc. 1,2,3,4)	Semi Public (Loc. 5,6)	Public (Loc. 7,8,9)
0-12	33 (81%)	21 (68%)	87 (36%)
13-18	3 (7%)	5 (16%)	47 (19%)
Adult	2 (5%)	3 (10%)	64 (26%)
Elderly	3 (7%)	2 (6%)	48 (20%)
	41 (100%)	31 (100%)	246 (100%)

TABLE 16  
SEX OF SUBJECTS BY PRIVACY LEVEL OF LOCATION

	Male n %	Female n %	Total n %
Semi Private	33 (81%)	8 (19%)	41 (100%)
Semi Public	23 (74%)	8 (26%)	31 (100%)
Public	189 (76%)	57 (24%)	236 (100%)

TABLE 17  
ACTIVITY TYPES BY PRIVACY LEVEL OF LOCATIONS

	Semi Private (Loc. 1,2,3,4)	Semi Public (Loc. 5,6)	Public (Loc. 7,8,9)	Total
Water Related	0	9	135	144
Movement	4	1	4	9
Toy	5	5	6	16
Bicycling	10	2	7	19
Other Active	13	8	15	36
Passive	8	6	45	59
Workchores	1	0	2	3
Dog Walking	0	0	32	32
Total	41	31	246	318

TABLE 18  
ACTIVITY GROUP BY AGE GROUPS  
(collapsed for  $\chi^2$  analysis)

	0-12	13-18	Adult	Eld.	Total
Movement, Work & Other Active	28	9	10	1	48
Toys, Objects & Bicycle Play	30	4	1	0	35
Passive	23	17	10	9	59
Water Related	57	20	31	36	144
Dog Walking	3	5	17	7	32
Total	141	55	69	53	318

$\chi^2 = 71.4^{***}$  on 12 degrees of freedom.

TABLE 19  
AGE GROUPS BY GROUP SIZE  
(collapsed for  $\chi^2$  analysis)

	Alone	w/Another	w/2 or 3 Others	w/ 4 or More	Total
0-12	34	57	36	14	141
13-18	15	14	15	11	55
Adult	43	13	11	2	69
Elderly	42	8	3	0	53
Total	134	92	65	27	318

$\chi^2 = 75.7^{***}$  on 9 degrees of freedom.

# APPENDIX B PARTIAL LIST OF SIGNS AND THEIR POSSIBLE MEANINGS

CATEGORY	OBSERVED SIGN	POSSIBLE MEANING
MAINTENANCE	1)Trash cans overturned	Trash containers inadequate to prevent children and dogs from overturning them.
	2)Trash flowing out of containers: -if containers are full	Trash collection too infrequent for containers of that size.
	3) -if containers are not full	Containers so designed or located so that it is easy to dump trash in some part of the container and not others.
	4)Litter, if excessive	Inadequate maintenance program.
	5)Clean areas amidst a littered site	Areas claimed and maintained by certain proximate residents.
	6)Uncollected large items (e.g. mattresses, refrigerators, abandoned cars)	Inadequate maintenance program.
	7)Rats	Inadequate maintenance program.
SECURITY	1)Many dogs, in backyards or in apartments	Poor neighborhood security.
	2)Additional security devices	Poor neighborhood security.
	3)All windows with closed shades and drawn curtains	Poor neighborhood security.
	4)Steel bars, screen, or mesh over windows	Poor neighborhood security.
	5)Windows near doors boarded up	Poor neighborhood security.

CATEGORY	OBSERVED SIGN	POSSIBLE MEANING
SECURITY (Con't.)		
	6)Jimmied doors	Poor neighborhood security.
	7)Vandalized cars	Poor neighborhood security.
	8)Unlocked car doors	Good neighborhood security.
	9)Unlocked bicycles left outside	Good neighborhood security.
	10)Items stored outside:	
	-if includes items of value (e.g. chairs, barbeque sets, sports equipment)	Good neighborhood security.
	-if includes no item of real value (e.g. trash cans, old mops & brooms, old tires)	Poor neighborhood security.
COMMUNITY		
	1)Stripped trees, trampled plants	Low level of control over chil- dren who use communal areas.
	2)Broken light fixtures and light poles	Low level of control over chil- dren who use communal areas.
	3)Broken windows, boarded up or left unattended	Tenants not able to afford re- pairs, and inadequate maintenance.
ACTIVITY SPACES		
	1)Worn paths in grassed areas	Short cuts.
	2)Worn areas in grassed areas	Preferred play areas.
	3)Damaged fencing	Tenants not able to afford re- pairs, children use for climb- ing, or as part of a game, like street hockey.
	4)Litter left behind:	
	-if candy wrappers and pop bottles and broken toys	Used by young children.



CATEGORY	OBSERVED SIGN	POSSIBLE MEANING
ACTIVITY SPACES (Con't.)	-if beer cans/bottles and cigarette wrappers/ butts	Gathering place of older chil- dren and teenagers.
TERRITORY	1)Planted area, flower potted area 2)Clothes lines or trees 3)Self-erected fencing 4>Welcome mats 5)Awnings 6)Grafitti	A claim on the involved area. A claim on the involved area. A claim on the involved area. Suggested entranceway. Definition of a semipublic zone. Lack of clear claims on the areas around the marked surfaces.
ATTRACTIVENESS	1)Fascade Alterations 2)Individualized painting scheme 3)Window boxes 4)Window decorations 5)Decorations on doors and entryways	Pride in own dwelling unit. Pride in own dwelling unit. Pride in own dwelling unit. Pride in own dwelling unit. Pride in own dwelling unit or group of units.

APPENDIX C  
QUESTIONNAIRE AND CODING INSTRUCTIONS

TYPE ONE QUESTIONS: QUESTIONS ASKED AT ALL THREE SITES

1. Do you have a yard?
2. (IF YES) What do you use it for?
3. Do you have any children living with you?
4. (IF YES) How old are they?
5. (IF ANY CHILD UNDER 19) Are there places on site for your children to play?
6. Where do they mostly play?
7. Do you feel there is adequate outdoor space for your activities?
8. Where do you go?
9. Do you like the way your house faces onto the street (or open space) or would you prefer it to be facing onto an open space (or street)?
10. Why is that?
11. Do you think this is a good size for a housing group?
12. About how many people here would you know well enough to greet?
13. Are there people here you would consider as friends (i.e. visit or invite home)?
14. In general, would you say this is a friendly place to live?
15. Do you feel safe living in this place?
16. Are you bothered by noise coming from the common open spaces?
17. Are you bothered by people looking right in?
18. Do you find this site attractive?
19. How do you feel about the upkeep of the common spaces?
20. Would you be willing to help?
21. How do you feel about the way people around here use the common open spaces? Do they take good care or do they abuse it?
22. Do you have convenient and adequate parking?
23. Do you like it better here or the last place you lived?
24. Overall, how satisfied are you with the outdoor spaces provided here?

TYPE TWO QUESTIONS: QUESTIONS ASKED IN ONE OR TWO SITES

PINE GROVE	WARREN GARDENS	ROXSE HOMES	
X	X		2a. (SKIP IF NO YARD) Are there things that you'd like to do here which are not possible?
X	X		2b. Is a yard important to you or would you rather not be bothered with it?
X	X		2c. Did you have your own private yard in other places where you lived?
X	X		5a. (IF ANY CHILD 5-12) When your child (children) plays on the site, do your ever feel that: ___ he has to cross dangerous roads ___ he is more likely to get hurt playing there than elsewhere ___ children who play there are not the kind you would prefer your children to mix with ___ it is a good idea to have someone keep an eye on him
		X	10a. Which court does your apartment belong to?
X	X		12a. Where do you most often meet them?
	X	X	12b. Do neighbors ever do things together?
		X	15a. Do neighbors watch out for each other?
X			18a. Are trees and grass where you live important to you?
	X	X	25. Do you plan to move away from here?

CODING INSTRUCTIONS FOR SELECTED RESPONSES QUALIFIED BY COMMENTS

3. Are there places on site for your children to play?

CODED POSITIVE if response is yes.

CODED NEGATIVE if children are kept at home or comments suggest that spaces are inadequate or inappropriate.

11. Do you think this is a good size for a housing group?

CODED POSITIVE if response is yes, or comments suggest identification of housing group as a unit of common interest e.g. social activities, neighboring, monitoring, upkeep.

CODED NEGATIVE otherwise.

15. Do you feel safe living in this place?

CODED POSITIVE if respondent feels safe or mentions low crime rates

CODED NEGATIVE if respondent remembers or has experienced crime, mentions additional security devices, or rationalizes by saying "good compared to..."

18. Are you bothered by noise coming from the common open spaces?

CODED POSITIVE if there is no noise, or don't remember any noise, or not bothered by noise, or noise only from within the building.

CODED NEGATIVE if bothered by noise even if only occasionally so.

17. Are you bothered by people looking right in?

CODED POSITIVE if respondent doesn't feel bothered regardless of screening or relation to public ways.

CODED NEGATIVE if respondent minds intrusion.

18. Do you find this site attractive?

CODED POSITIVE if response is yes or comments show some delight in the appearance of the site.

CODED NEGATIVE if respondent mentions "attractive in the past but..."  
"attractive if we (they) would..."  
"attractive except for damage and poor upkeep..."  
"relatively attractive"

19. How do you feel about the upkeep of the common spaces?

CODED EXCELLENT if so evaluated.

CODED GOOD if "good job and I'm willing to help"

CODED AVERAGE if "all right, but I'm not involved with it" or "I don't notice"

CODED POOR if "all right except for....(specific problems)

CODED TERRIBLE if "don't do their job" or "do a lousy job"

# APPENDIX D RESPONSES TO THE INTERVIEW QUESTIONS

## TYPE ONE QUESTIONS: QUESTIONS ASKED AT ALL THREE SITES

Answers to questions 5,7,11,14,15,16,17,18,19,21,22,23,24 have already been tabulated, (TABLE 4). Their tabulations are not repeated below.

1. Do you have a yard? (n = 43)
 

YES: 21 (49%)	NO: 22 (51%)
---------------	--------------
2. If yes, what do you use it for? (n = 21)
 

CHILDREN'S PLAY:	12 (57%)
BARBECUE AND COOKOUTS:	12 (57%)
SITTING OUT AND SUNNING:	7 (33%)
PARTIES, GET - TOGETHERS:	3 (14%)
OTHERS MENTIONED BY ONE OR TWO RESPONDENTS NOT TABULATED	
DO NOT USE AT ALL:	4 (19%)
3. Do you have any children living with you? (n = 43)
 

YES: 36 (84%)	NO: 7 (16%)
---------------	-------------
4. If yes, how old are they? (n = 36)
 

0-2	13 (35%)
3-4	14 (38%)
5-9	24 (65%)
10-12	12 (32%)
13-15	12 (32%)
16-18	12 (32%)
5. See TABLE 4.
6. Where do they mostly play? (n = 37)
 

PARKING LOTS OR PAVED SPACES IN FRONT:	15 (41%)
DESIGNATED PLAY AREAS:	12 (32%)
NOT ALLOWED TO PLAY OUTSIDE:	6 (16%)
AWAY FROM SITE:	3 (8%)
ALL OVER:	2 (5%)
DON'T KNOW:	3 (8%)

7. See TABLE 4.

8. Where do you go? (n = 43)

METROPOLITAN OR STATE RECREATION AREAS:	21 (49%)
CITY OR TOWN RECREATION AREAS:	16 (37%)
NEIGHBORHOOD RECREATION AREAS:	8 (19%)
SITE RECREATION AREAS:	2 (5%)
NO PLACE TO GO:	2 (5%)
NO ANSWER:	13 (30%)

9. Do you like the way your house faces onto the street (or open space) or would you prefer it to be facing onto an open space (or street)?

OPEN SPACE:	26 (65%)
STREET OR PARKING AREA:	12 (28%)
NO DIFFERENCE:	3 (7%)

10. Why is that?

PREFER OPEN SPACE BECAUSE: (n = 26)

BETTER FOR CHILDREN'S PLAY:	9 (35%)
SAFER FOR CHILDREN'S PLAY:	9 (35%)
BETTER VIEW:	7 (27%)
BETTER SECURITY:	2 (8%)
OTHER:	4 (15%)

PREFER STREET OR PARKING BECAUSE: (n = 14)

MORE CONVENIENT:	5 (36%)
OTHER:	4 (29%)

11. See TABLE 4.

12. About how many people would you know well enough to greet?

ACQUAINTED WITH AT LEAST HALF OF THEIR NEIGHBORS:	23 (53%)
ACQUAINTED WITH FEWER THAN HALF OF THEIR NEIGHBORS:	20 (47%)

13. Are there people here you would consider as friends (i.e. visit or invite home)?

HAD AT LEAST A COUPLE OF FRIENDS:	21 (49%)
DID NOT HAVE EVEN A COUPLE OF FRIENDS:	22 (51%)

14-19. See TABLE 4.

20. Would you be willing to help (with the cleanup)?

YES:	21 (49%)	NO:	15 (35%)
YES, BUT...	7 (16%)		

21-24. See TABLE 4.

## APPENDIX E

### THE CHOICE AND THE ARRANGEMENT OF SITE OPEN SPACES

The suggestions in this appendix are meant to make clear some constraints involved in the choice and the arrangement of open spaces in housing developments. The suggestions or working guidelines are arranged under four relevant factors -- locational, density, resident, and management characteristics of the site.

Various conditions under each factor may have different implications of the actual physical design. Independent conditions in a site may thus imply apparently inconsistent design solutions. This situation calls for a design that can balance off opposing demands. For example, we are trying to determine whether a central court of a low income family housing cluster should be a paved parking area or a grassed play area. Guideline 9.4 argues that a parking lot meets a need of this income group. On the other hand, guideline 11.2 argues for separation of traffic from preferred play areas. In this cluster, the entranceways of the dwellings are right off the central court and it is likely to be heavily used by the children. The final choice must be able to meet both conflicting needs. In this example, the architect might find out that most of the cars in the development are gone during working hours. He could thus put a parking lot into the central court with a part that could be cordoned off from parking or traffic during the day. This part could then be used by the children as paved play areas in addition to their entranceways.

This example illustrates the intent of these guidelines as helping define design solutions but not necessarily suggesting any particular design.

## High Crime Area

- 1.1 A buffer should be created between the dwelling and public accessways. This buffer can be a space such as a small enclosed yard, or a built element such as a porch, or a change in elevation such as an entrance accessible via a stoop.
- 1.2 Yards will not likely be used for storage of items of value (including snow tires, garden tools, barbeque sets, and patio chairs) unless locked storage is provided or unless the particular dwelling unit is in a section of the site that is relatively inaccessible to the public.
- 1.3 Space should be provided to keep a watchdog that can help guard the home when the residents are away. If a yard is provided for that purpose, the yard should be so enclosed as to keep the dog inside. A high fence will further enhance the deterrent value of a watchdog by keeping the potential intruder in the dark about the unseen animal that barks whenever he approaches the fenced yard.
- 1.4 If a courtyard arrangement is used the shared space should be small, (i.e. not much more than the combination of the entrance zones of the surrounding dwellings). This conditions will also help limit the maximum number of units around the courtyard. Windows and doorways should be so oriented as to facilitate



## High Crime Area (con't.)

surveillance of the courtyard.

- 1.5 If the residents own cars, parking areas should be provided so residents can see their cars from their dwellings. Car theft is a serious problem that can be controlled by better surveillance of parking areas.

## Secure Area

- 2.1 Windows of dwellings should be separated by some distance from public accessways.
- 2.2 Yards will likely be used as overflow storage space. Provisions should be made for some enclosed storage space to protect stored items from the weather.
- 2.3 If no yards are provided, areas for parking bicycles, motorcycles, and storage should be provided near the entrance to the dwelling.
- 2.4 Fencing around the yard does not need to be complete visual barriers. Fencing should be chosen to keep toddlers playing in the yard from wandering away.
- 2.5 Surveillance of neighbor's dwelling is a less critical need. So that it is possible to have the main entrances to clustered dwelling units at the periphery of the cluster instead of through the central courtyard.

## "Street Life Community"

- 3.1 Yards even when suitable will not likely be used for activities.
- 3.2 The main entranceway of the dwelling should be oriented toward the street. A

Locational Characteristics

Implications for Physical Design

"Street Life Community"  
(con't.)

porch or a stoop should be provided as both a buffer and as a place to "watch the action" or to socialize informally.

Neighborhood Facilities  
Inadequate

4.1 If there is enough space on site, some areas should be opened for neighborhood use. Other shared spaces should be clearly defined for the sole use of the residents. Decreasing the proportion of shared open spaces and increasing the proportion of private open space is a reasonable alternative.

B. Density Characteristics

Implications for Physical Design

High Dwelling Unit Density  
(Above 35 dwelling  
units per acre)

5.1 A high dwelling unit density often results in higher rise buildings in order to preserve some ground level open space. Unfortunately, ground level open spaces are rarely used by children who live above the second or third floors. This suggests that higher rise buildings should provide some above-ground communal spaces for children on upper floors.

Medium Dwelling Unit  
Density (Between 10 and  
35 dwelling units per acre)

6.1 There is considerable flexibility in the choice of dwelling types -- in terms of number of floors, attached or detached units, clustered or row arrangements. The open spaces required by other conditions can thus be defined in a variety of ways.

Low Dwelling Unit Density (Below 10 dwelling units per acre)

7.1 If the site is not partitioned out into lots with single family detached houses, then there is again considerable flexibility in the choice of other dwelling types. If a cluster scheme is used, the question will be what to do with the spaces between the clusters. Here more undefined and undesignated space allows greater freedom to meet the requirements of a large range of conditions.

Children Density

8.1 Unlike dwelling unit density, children density does not necessarily remain constant over the life of the development even if no physical changes are made. If the resident population is fairly stable, then the families go through life cycle changes which affect the total number of children in the site. If the resident population is transient, there is always the possibility that the family composition of the development may change.

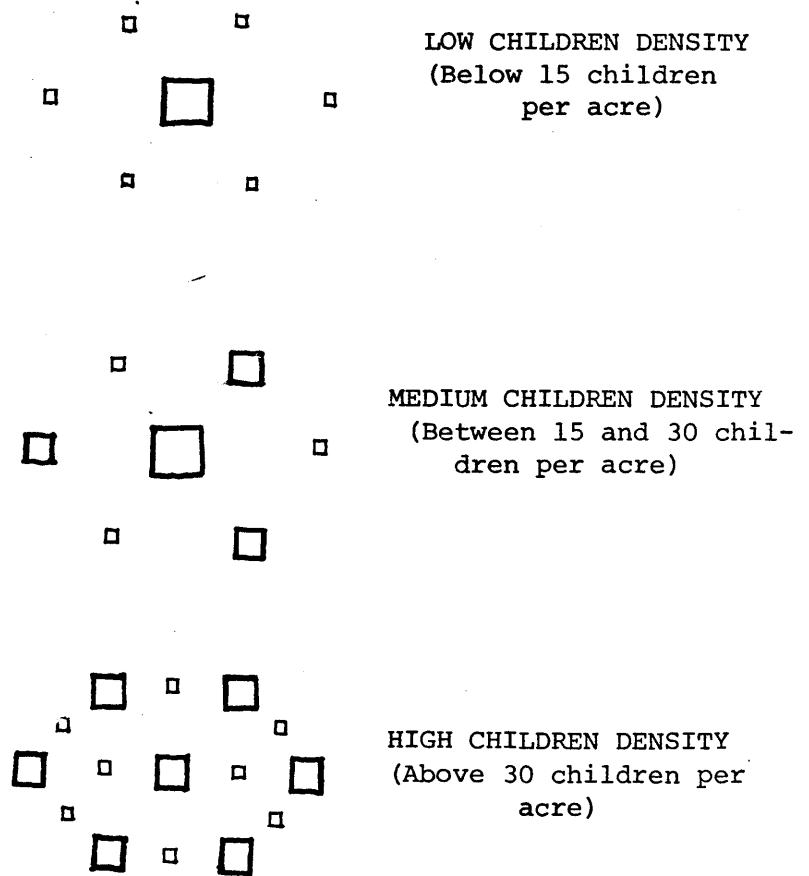
As a consequence, the network of site open spaces should have a certain built-in flexibility to handle different children densities.

FIGURE 29 shows diagrammatically the changes that should occur in a hypothetical site to respond to changes in children density. Each square in the diagram represents a shared open space. Three

Children Density (con't.)

sizes of squares represent small, medium and large open spaces.

FIGURE 29  
CHANGES IN SITE OPEN SPACES IN  
RESPONSE TO CHANGES IN CHILDREN  
DENSITY



The shared open spaces diagrammed in FIGURE 29 can be increased and/or decreased step in size by redefining certain sub-areas within the open space as either shared or private depending on the need for shared

## Density Characteristics

## Implications for Physical Design

### Children Density (con't.)

space. With a low children density, most shared open spaces are left small in proportion to the smaller demand for child play areas. A large central space or space of particular interest is created in order to provide an area where many children can congregate.

As the children density increases to the medium level, there is more need for shared open space. Few of the small shared open spaces are increased in size. As a network, shared open spaces with this density level have the greatest size variety.

As the children density increases to the high level, the remaining small shared open spaces are increased one step in size. In addition, new shared spaces are created from previously private open spaces. These changes are needed to meet the greater demand for shared space. However, none of the spaces are increased to the largest size, and the central space is in fact decreased in size. The use of medium sized open spaces as the maximum size for this density attempts to prevent too many children gathering in one space at a given time and disturbing the proximate residents.

## C. Resident Characteristics

## Implications for Physical Design

### Low Income Families

9.1 Not likely to be able to afford to pay

Low Income Families (con't.)

for gardening tools and supplies. This suggests that a low upkeep paved patio may be appropriate.

- 9.2 Not likely to do much entertaining at home, which suggests the private open spaces should primarily be planned around the needs of the family members.
- 9.3 Likely to have to perform many repair and refinishing work themselves, available spaces should be designed with this work in mind. For example, electrical outlets, water spigots, waste disposal facilities should be provided near parking lots where much auto repair work will likely be done.
- 9.4 Some low income families consider the car an extension of their living room. Access to and visibility of the car from the dwelling unit is important. In addition good supervision may lessen the possibility of car theft or vandalism which is a major loss to a car owner who could not afford adequate insurance. Loss of a car may also lead to loss of a job if the car was the only appropriate means of transportation.

Working Families

- 10.1 Adults who work away from home during much of the day prefer high levels of privacy in their dwelling units and yards. If yards are provided, they need not be large, but should be screened for visual privacy.

- Working Families (con't.)
- 10.2 Adults who hold more than one job have little time for leisure activities. Site recreational spaces will thus rarely be used by this group.
- 10.3 Moderate or middle income families will have more time for leisure activities. Site recreational spaces will, however, only meet a small part of their leisure needs. Site recreational spaces should therefore be chosen only to complement facilities available within easy driving distances.

Families with Children

- 11.1 If the development primarily houses young and transient families, spaces should be provided for toddlers and young children. Supervised play areas are one possibility. In developments where funds or personnel are inadequate for such a communal facility, yards should be provided that are large enough for a substantial part of the play needs of children under five years of age.
- 11.2 Whether or not yards are provided, and regardless of their dimensions when provided, certain areas will always attract children of all ages. Specifically we have the following:
- the entranceway to the dwelling
  - nearby streets and sidewalks
  - paved areas such as parking lots
  - or pedestrian paths
  - slopes and mounds
  - rock outcroppings
  - water (ponds, ditches, culverts)
- In developments where there is substan-

Families with Children  
(con't.)

tial vehicular traffic, provisions should be made to protect the children playing in the above areas. Cars could be slowed down in some areas, and restricted from other areas.

These preferred play places are potentially noisy, and even more so when the particular place is fairly unique in the site. In the case of the landscaping elements, due consideration should thus be given to their relation to dwelling units.

11.3 In developments where there is likely to be many children of all ages, and insufficient site open space, priority in site spaces should first be given to the toddlers, then to the young children. The site is not expected to meet most of the needs of the older children and the teens. Space for the younger children should be so defined as to be of primary interest only to the younger children so as to lessen competition from older children.

11.4 Adults who stay home and tend to children and housechores have a lower need for privacy in open spaces. Open spaces should be provided for some gardening and laundry activities. If yards are provided, they should not be so screened as to shut off the potential of informal contact between neighbors involved in gardening and housework.



Resident Characteristics

Implications for Physical Design

Elderly Families

12.1 In developments that house at least some elderly people, a high priority should be places on outdoor spaces for them. At the very minimum, a semi-private space such as a porch, a balcony, or a partially enclosed yard should be provided for older people to sit out to visit, and to watch what is going on outside. Space for some gardening may be appreciated if:

- it is not so large as to become a burden for the elderly to upkeep
- it has some raised planting areas for some elderly who cannot bend down
- it allows for some casual socializing and the display of their gardening skills
- it is appropriately fenced to keep out children and animals that will damage the plants.

12.2 In mixed-age developments where units may be designated for elderly tenants, it would be best to locate the unit some distance from preferred play areas of children so that play noise does not become disturbing to the elderly tenants. At the same time, it is not inappropriate to provide the elderly with a distant view of a play area or space.

D. Management Characteristics

Implications for Physical Design

Ineffective Management

13.1 If it appears likely that management will not have adequate resources to do a good job of maintenance, and it is

Ineffective Management  
(con't.)

unlikely that the management can organize the tenants to help, then the proportion of shared open spaces should be decreased in favor of larger proportion of private open spaces.

Effective Management

14.1 If it appears likely that management will have adequate resources to do a good job of maintenance, then the development can support a system of shared open spaces. If, on the other hand, the management is able to elicit tenant help in upkeep efforts, then the development can support a series of smaller and publicly less accessible shared spaces when there is insufficient site spaces for larger shared space. If the management has both resources to do a good job as well as guarantees of tenant support, then the site is able to support the fullest range of open space types and sizes.

## CHAPTER TWO THE FIELDWORK

<sup>1</sup> Paul Battaglia et al, "Site Analysis: Vital Aspects of Pine Grove," (Unpublished report, MIT site planning course, 11.31, 1973); Randall Imai, "Litter in Open Spaces of Multi-Family Housing Sites," (Unpublished M. ARCH. A.S. Thesis, MIT, 1973); Sandra Anchincloss et al, "A Survey of Roxse Homes," (Unpublished report, MIT site planning course, 11.31, 1973).

<sup>2</sup> Gary Coates and Henry Sanoff, "Behavior Mapping: The Ecology of Child Behavior in a Planned Residential Setting," EDRA 2, Henry Sanoff and John Dickerson, "Mapping Children's Behavior in a Residential Setting," J. of Arch.Ed. 24:4, 1971, pp.98-103.

<sup>3</sup> Questions 2b,2c,6,9,14,18a,23 (APPENDIX C) were respectively adapted from questions 23,22,44,38,63,34,86 of Clare Cooper, Easter Hill Village, (New York: The Free Press, 1975), pp. 288-294.

<sup>4</sup> Question 5a (APPENDIX C) was adapted from Vere Hole Children's Play on Housing Estates, National Building Studies Research Paper 39, (London: HMSO, 1966), p.27.

<sup>5</sup> Department of the Environment, Children at Play, (London HMSO, 1973) Danish National Institute of Building Research, Children's Use of Recreational Areas, (Coopenhagen: The Institute, 1969).  
H. Wohlin, Outdoor Play and Play Spaces, (Stockholm, 1961).

<sup>6</sup> The primary source of site information has been Paul Battaglia et al "Site Analysis: Vital Aspects of Pine Grove." Supplementary information is from interviews with Mr. Alan Hight, the site manager for Pemberton Management Company.

<sup>7</sup> Information on Warren Gardens primarily came from the 1970 U.S. Census and from interviews with Mr. Enoch Williams, site manager.

<sup>8</sup> The primary sources of site information has been "A Survey of Roxse Homes" and interviews with Mr. Roland T. Peters, site manager and president of Artepe Management Company.

<sup>9</sup> Amos Rapoport, "Toward a Redefinition of Density," ENVIRONMENT AND BEHAVIOR, vol. 7, no.2, June 1975, pp.133-158.

CHAPTER THREE THE CONCEPTUAL FRAMEWORK

- <sup>1</sup>Cooper, Easter Hill Village, p. 135.
- <sup>2</sup>Robert W. Marans and Willard Rodgers, Toward an Understanding of Community Satisfaction, (Ann Arbor: Institute for Social Research, 1972).  
N. Foote, J. Abu-Lughod, M.M. Foley, and L. Winnick, Housing Choice and Housing Constraints, (New York: McGraw Hill, 1960).  
Zehner, R.B., "Neighborhood and Community Satisfaction in New Towns and Less Planned Suburbs," Journal of the American Institute of Planners, vol. 37 (1971), pp. 379-385.
- <sup>3</sup>Donald Curtis Royse, "Social Inferences via Environmental Cues," (unpublished Ph.D. dissertation, Massachusetts Institute of Technology, 1969), p.95.
- <sup>4</sup>Ibid., p. 147.
- <sup>5</sup>These studies are cited in Easter Hill Village, p. 222.
- <sup>6</sup>MHFA, A Social Audit of Mixed-Income Housing, (Boston 1974).
- <sup>7</sup>Ibid., p. 20.
- <sup>8</sup>Terrence Lee, "Urban Neighborhood as a Socio-Spatial Schema," EKISTICS 177, (Aug., 1970), p. 128.
- <sup>9</sup>Mixed-Income Housing, p. 21.
- <sup>10</sup>Six British studies are cited by Cooper, Easter Hill Village, p.220.
- <sup>11</sup>This definition is patterned after one cited in Irwin Altman, The Environment and Social Behavior, (Monterey, California: Brooks/Cole Publishing Co., 1975), p. 18.
- <sup>12</sup>Easter Hill Village, p. 218.
- <sup>13</sup>The Environment and Social Behavior, p. 106.
- <sup>14</sup>Ten Studies are cited by Cooper, Easter Hill Village, p. 231.
- <sup>15</sup>Gary Coates and Ellen Bussard, "Pattern of Children's Spatial Behavior in a Moderate-Density Housing Development," EDRA, 1974.  
Department of the Environment, Children at Play.  
Coates and Sanoff, "Behavior Mapping."

- <sup>16</sup> Anne-Marie Pollowy, Children in the Residential Setting, (Montreal: Centre de Recherches et d'innovation Urbaines, 1973), p. 16.
- <sup>17</sup> Children at Play, p. 16.
- <sup>18</sup> Children in the Residential Setting, p. 16
- <sup>19</sup> Frederick Froebel, The Education of Man, (New York; Appleton, 1887), p. 103 cited in Ibid., p. 78.
- <sup>20</sup> Arnold Gessell(ed), The First Five Years of Life: A Guide to the Study of the Preschool Child, (New York: Harper 1940), cited in Ibid., p. 84.
- <sup>21</sup> Please see chart in Children at Play, p. 18.
- <sup>22</sup> Children in the Residential Setting, p. 17.
- <sup>23</sup> Robin Moore, "Patterns of Activity in Time and Space: The Ecology of a Neighborhood Playground" in David Canter and Terrence Lee (eds.), Psychology and the Built Environment, (New York: John Wiley and Sons, 1974), p. 120.
- <sup>24</sup> David Krech, Richard S. Crutchfield, and Norman Livson, Elements of Psychology, (New York: Alfred A. Knopf, 1969), p. 498.
- <sup>25</sup> "Social Influences via Environmental Cues," p. 147.
- <sup>26</sup> Elements of Psychology, p. 499.
- <sup>27</sup> Oscar Newman, Defensible Space: Crime Prevention Through Urban Design, (New York: The MacMillan Co., 1972), pp. 166-170.
- <sup>28</sup> A 1968 HUD "In-Cities Experiment" cited in Progressive Architecture (May, 1971), p. 106.
- <sup>29</sup> David Stuart Stern, "The Use of Neighborhoods by Mothers and Young Children," (unpublished M.C.P. Thesis, Massachusetts Institute of Technology; 1968), p. 64.
- <sup>30</sup> Carl Norcross, Townhouses and Condominiums; Residents' Likes and Dislikes, (Washington, D.C.: Urban Land Institute, 1973), p. 15.
- <sup>31</sup> Easter Hill Village, p. 134.
- <sup>32</sup> Easter Hill Village, p. 246.

# CHAPTER FOUR      THE ANALYSIS

<sup>1</sup>A chi-square statistic was calculated from the two-way contingency table for each of the categories (or subcategories). For example, for the relationship between Maintenance and the Overall Satisfaction, we form the following two-way contingency table:

		OVERALL SATISFACTION			
MAINTENANCE	RESPONSE	HIGH	AVERAGE	LOW	TOTAL
	POSITIVE	14	3	1	18
	RESPONSE	3	14	8	25
	NON-POSITIVE				
TOTAL		17	17	9	43

The  $\chi^2$  value on 2 degrees of freedom is 19.06 and it is statistically significant at  $p=0.005$ .

CHAPTER FIVE      THE SYNTHESIS OF FINDINGS

<sup>1</sup>J.B. Lansing and R.W. Marans, "Evaluation of Neighborhood Quality," Journal of the American Institute of Planners (vol. 35, 1969); Zehner, "Neighborhood and Community Satisfactions"; Foote et al, "Housing Choice and Housing Constraints".

<sup>2</sup>Shankland, Cox and Associates, Private Housing in London: People and Environment in Three Watts Housing Schemes, (London, 1969), p. 71.

<sup>3</sup>"Social Inferences via Environmental Cues," p. 147.

<sup>4</sup>Easter Hill Village, p. 145.

<sup>5</sup>"Litter in Open Spaces," pp.48-49.

<sup>6</sup>Ibid., p.74.

<sup>7</sup>Other studies such as Clare Cooper, "Bannecker Homes," (EDRA 5,1974), and Children at Play also observed slopes to be favorite children play spaces.

<sup>8</sup>Department of the Environment, The Estate Outside the Dwelling: Reactions of Residents to Aspects of Housing Layout, (London, HMSO, 1972).

<sup>9</sup>Easter Hill Village, p. 149.

<sup>10</sup>Children in the Residential Setting, p. 31.

<sup>11</sup>Ibid.

<sup>12</sup>"Towards an Understanding of Community Satisfaction" and Gloria Sandvik, Barbara B. Shellenbarger, and Margaret M. Stevenson, Resident Evaluation of Four Planned Unit Developments: Eugene, Oregon., Report for Eugene Planning Department, 1973.

<sup>13</sup>Oscar Newman, Defensible Space: Crime Prevention Through Urban Design, (New York: The MacMillan Co., 1972), pp.166-170.

<sup>14</sup>Clare Cooper Marcus, "Children's Play Behavior in a Low-Rise, Inner-City Housing Development," (EDRA, 1974), p. 199.

<sup>15</sup>Ibid., and Shirley and David Parish, A Study of Four Bridgeport Housing Developments, (Bridgeport, Conn.: Zane Yost and Associates, 1972).

<sup>16</sup>John Zeisel and Mary Griffin, "Feedback Charlesview: A Diagnostic Evaluation of Charlesview Housing, Allston, Mass.," (Cambridge, Mass.: no date).

<sup>17</sup>"Survey of Roxse Homes," p. vii.2.

<sup>18</sup>"Site Analysis: Vital Aspects of Pine Grove," Pages Unnumbered.



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